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MCQ WORKSHEET-I
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. Rational number $\frac{3}{40}$ is equal to:

(a) 0.75 (b) 0.12 (c) 0.012 (d) 0.075

2. A rational number between 3 and 4 is:

(a) $\frac{3}{2}$ (b) $\frac{4}{3}$ (c) $\frac{7}{2}$ (d) $\frac{7}{4}$

3. A rational number between $\frac{3}{5}$ and $\frac{4}{5}$ is:

(a) $\frac{7}{5}$ (b) $\frac{7}{10}$ (c) $\frac{3}{10}$ (d) $\frac{4}{10}$

4. A rational number between $\frac{1}{2}$ and $\frac{3}{4}$ is:

(a) $\frac{2}{5}$ (b) $\frac{5}{8}$ (c) $\frac{4}{3}$ (d) $\frac{1}{4}$

5. Which one of the following is not a rational number:

(a) $\sqrt{2}$ (b) 0 (c) $\sqrt{4}$ (d) $\sqrt{-16}$

6. Which one of the following is an irrational number:

(a) $\sqrt{4}$ (b) $3\sqrt{8}$ (c) $\sqrt{100}$ (d) $-\sqrt{0.64}$

7. Decimal representation of $\frac{1}{5}$ is :

(a) 0.2 (b) 0.5 (c) 0.02 (d) 0.002

8. $3\frac{3}{8}$ in decimal form is:

(a) 3.35 (b) 3.375 (c) 33.75 (d) 337.5

9. $\frac{5}{6}$ in the decimal form is:

(a) $0.8\bar{3}$ (b) $0.8\overline{33}$ (c) $0.6\bar{3}$ (d) $0.6\overline{33}$

10. Decimal representation of rational number $\frac{8}{27}$ is:

(a) $0.\overline{296}$ (b) $0.29\bar{6}$ (c) $0.2\overline{96}$ (d) 0.296

MCQ WORKSHEET-II
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. Which one of the following is a rational number:
(a) $\sqrt{3}$ (b) $\sqrt{2}$ (c) 0 (d) $\sqrt{5}$

2. 0.6666 in $\frac{p}{q}$ form is:
(a) $\frac{6}{99}$ (b) $\frac{2}{3}$ (c) $\frac{3}{5}$ (d) $\frac{1}{66}$

3. $4\frac{1}{8}$ in decimal form is:
(a) 4.125 (b) $4.\overline{15}$ (c) $4.1\overline{5}$ (d) $0.\overline{415}$

4. The value of $\left(3+\sqrt{3}\right)\left(3-\sqrt{3}\right)$ is:
(a) 0 (b) 6 (c) 9 (d) 3

5. The value of $\left(\sqrt{5}+\sqrt{2}\right)^2$ is:
(a) $7+2\sqrt{5}$ (b) $1+5\sqrt{2}$ (c) $7+2\sqrt{10}$ (d) $7-2\sqrt{10}$

6. The value of $\left(\sqrt{5}+\sqrt{2}\right)\left(\sqrt{5}-\sqrt{2}\right)$ is:
(a) 10 (b) 7 (c) 3 (d) $\sqrt{3}$

7. The value of $\left(3+\sqrt{3}\right)\left(2+\sqrt{2}\right)$ is:
$(a) 6+3\sqrt{2}+2\sqrt{3}+\sqrt{6}$
$(b) 3+3\sqrt{2}+3\sqrt{3}+6$
$(c) 6-3\sqrt{2}-2\sqrt{3}-\sqrt{6}$
$(d) 6-3\sqrt{2}+2\sqrt{3}-\sqrt{6}$

8. The value of $\left(\sqrt{11}+\sqrt{7}\right)\left(\sqrt{11}-\sqrt{7}\right)$ is:
(a) 4 (b) – 4 (c) 18 (d) – 18

9. The value of $\left(5+\sqrt{5}\right)\left(5-\sqrt{5}\right)$ is :
(a) 0 (b) 25 (c) 20 (d) – 20

10. On rationalizing the denominator of $\frac{1}{\sqrt{7}}$, we get
(a) 7 (b) $\frac{\sqrt{7}}{7}$ (c) $\frac{-\sqrt{7}}{7}$ (d) $\sqrt{7}$

MCQ WORKSHEET-III
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. On rationalizing the denominator of $\frac{1}{\sqrt{7}-\sqrt{6}}$, we get

(a) $\frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}-\sqrt{6}}$ (b) $\frac{\sqrt{7}-\sqrt{6}}{\sqrt{7}+\sqrt{6}}$ (c) $\sqrt{7}+\sqrt{6}$ (d) $\sqrt{7}-\sqrt{6}$

2. On rationalizing the denominator of $\frac{1}{\sqrt{5}+\sqrt{2}}$, we get

(a) $\sqrt{5}-\sqrt{2}$ (b) $\sqrt{2}-\sqrt{5}$ (c) $\frac{\sqrt{5}-\sqrt{2}}{3}$ (d) $\frac{\sqrt{2}-\sqrt{5}}{3}$

3. On rationalizing the denominator of $\frac{1}{\sqrt{7}-2}$, we get

(a) $\sqrt{7}-2$ (b) $\sqrt{7}+2$ (c) $\frac{\sqrt{7}+2}{3}$ (d) $\frac{\sqrt{7}-2}{3}$

4. On rationalizing the denominator of $\frac{1}{\sqrt{2}}$, we get

(a) 2 (b) $\sqrt{2}$ (c) $\frac{2}{\sqrt{2}}$ (d) $\frac{\sqrt{2}}{2}$

5. On rationalizing the denominator of $\frac{1}{2+\sqrt{3}}$, we get

(a) $2-\sqrt{3}$ (b) $\sqrt{3}-2$ (c) $2+\sqrt{3}$ (d) $-\sqrt{3}-2$

6. On rationalizing the denominator of $\frac{1}{\sqrt{3}-\sqrt{2}}$, we get

(a) $\frac{1}{\sqrt{3}+\sqrt{2}}$ (b) $\sqrt{3}+\sqrt{2}$ (c) $\sqrt{2}-\sqrt{3}$ (d) $-\sqrt{3}-\sqrt{2}$

7. The value of $64^{\frac{1}{2}}$ is :

(a) 8 (b) 4 (c) 16 (d) 32

8. The value of $32^{\frac{1}{5}}$ is :

(a) 16 (b) 160 (c) 2 (d) 18

9. The value of $(125)^{\frac{1}{3}}$ is :

(a) 5 (b) 25 (c) 45 (d) 35

10. The value of $9^{\frac{3}{2}}$ is :

(a) 18 (b) 27 (c) – 18 (d) $\frac{1}{27}$

MCQ WORKSHEET-IV
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. The value of $32^{2/5}$ is :
(a) 2 (b) 4 (c) 16 (d) 14

2. The value of $16^{3/4}$ is :
(a) 4 (b) 12 (c) 8 (d) 48

3. The value of $125^{\frac{-1}{3}}$ is :
(a) $\frac{1}{5}$ (b) $\frac{1}{25}$ (c) $\frac{1}{15}$ (d) $\frac{1}{125}$

4. The value of $11^{1/2} \div 11^{1/4}$ is :
(a) $11^{1/4}$ (b) $11^{3/4}$ (c) $11^{1/8}$ (d) $11^{1/2}$

5. The value of $64^{-3/2}$ is :
(a) $\frac{1}{96}$ (b) $\frac{1}{64}$ (c) 512 (d) $\frac{1}{512}$

6. The value of $(125)^{\frac{2}{3}}$ is :
(a) 5 (b) 25 (c) 45 (d) 35

7. The value of $25^{3/2}$ is :
(a) 5 (b) 25 (c) 125 (d) 625

8. The value of $\frac{1}{11}$ in decimal form is:
(a) $0.0\overline{99}$ (b) $0.\overline{909}$ (c) $0.\overline{09}$ (d) $0.00\overline{9}$

9. Decimal expansion of a rational number is terminating if in its denominator there is:
(a) 2 or 5 (b) 3 or 5 (c) 9 or 11 (d) 3 or 7

10. The exponent form of $\sqrt[3]{7}$ is:
(a) 7^3 (b) 3^7 (c) $7^{1/3}$ (d) $3^{1/7}$

MCQ WORKSHEET-V
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. Which of the following is true?
(a) Every whole number is a natural number (b) Every integer is a rational number
(c) Every rational number is an integer (d) Every integer is a whole number

2. For Positive real numbers a and b, which is not true?
(a) $\sqrt{ab}=\sqrt{a}\sqrt{b}$ (b) $\left(a+\sqrt{b}\right)\left(a-\sqrt{b}\right)=a^2-b$
(c) $\sqrt{\frac{a}{b}}=\frac{\sqrt{a}}{\sqrt{b}}$ (d) $\left(\sqrt{a}+\sqrt{b}\right)\left(\sqrt{a}-\sqrt{b}\right)=a+b$

3. Out of the following, the irrational number is
(a) $1.\bar{5}$ (b) $2.4\overline{77}$ (c) $1.2\overline{77}$ (d) π

4. To rationalize the denominator of $\frac{1}{\sqrt{a}+b}$,we multiply this by
(a) $\frac{1}{\sqrt{a}+b}$ (b) $\frac{1}{\sqrt{a}-b}$ (c) $\frac{\sqrt{a}+b}{\sqrt{a}+b}$ (d) $\frac{\sqrt{a}-b}{\sqrt{a}-b}$

5. The number of rational numbers between $\sqrt{3}$ and $\sqrt{5}$ is
(a) One (b) 3 (c) none (d) infinitely many

6. If we add two irrational numbers, the resulting number
(a) is always an irrational number (b) is always a rational number
(c) may be a rational or an irrational number (d) always an integer

7. The rationalizing factor of $7-2\sqrt{3}$ is
(a) $7-2\sqrt{3}$ (b) $7+2\sqrt{3}$ (c) $5+2\sqrt{3}$ (d) $4+2\sqrt{3}$

8. If $\frac{1}{7}=0.\overline{142857}$, then $\frac{4}{7}$ equals
(a) $0.\overline{428571}$ (b) $0.\overline{571428}$ (c) $0.\overline{857142}$ (d) $0.\overline{285718}$

9. The value of n for which $\sqrt{n}$ be a rational number is
(a) 2 (b) 4 (c) 3 (d) 5

10. $\frac{3\sqrt{12}}{6\sqrt{27}}$ equals
(a) $\frac{1}{2}$ (b) $\sqrt{2}$ (c) $\sqrt{3}$ (d) $\frac{1}{3}$

11. $\left(3+\sqrt{3}\right)\left(3-\sqrt{2}\right)$ equals
(a) $9-5\sqrt{2}-\sqrt{6}$ (b) $9-\sqrt{6}$ (c) $3+\sqrt{2}$ (d) $9-3\sqrt{2}+3\sqrt{3}-\sqrt{6}$

12. The arrangement of $\sqrt{2}, \sqrt{5}, \sqrt{3}$ in ascending order is

(a) $\sqrt{2}, \sqrt{3}, \sqrt{5}$ (b) $\sqrt{2}, \sqrt{5}, \sqrt{3}$ (c) $\sqrt{5}, \sqrt{3}, \sqrt{2}$ (d) $\sqrt{3}, \sqrt{2}, \sqrt{5}$

13. If m and n are two natural numbers and $m^n = 32$, then n^{mn} is

(a) 5^2 (b) 5^3 (c) 5^{10} (d) 5^{12}

14. If $\sqrt{10} = 3.162$, then the value of $\frac{1}{\sqrt{10}}$ is

(a) 0.3162 (b) 3.162 (c) 31.62 (d) 316.2

15. If $\left(\frac{3}{4}\right)^6 \times \left(\frac{16}{9}\right)^5 = \left(\frac{4}{3}\right)^{x+2}$, then the value of x is

(a) 2 (b) 4 (c) -2 (d) 6

PRACTICE QUESTIONS
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. Prove that $\sqrt{5}-\sqrt{3}$ is not a rational number.

2. Arrange the following in descending order of magnitude: $\sqrt[8]{90}, \sqrt[4]{10}, \sqrt{6}$

3. Simplify the following:

$(i)\left(4\sqrt{3}-2\sqrt{2}\right)\left(3\sqrt{2}+4\sqrt{3}\right)$

$(ii)\left(2+\sqrt{3}\right)\left(3+\sqrt{5}\right)$

$(iii)\left(\sqrt{3}+\sqrt{2}\right)^2$

$(iv)\left(\frac{2}{3}\sqrt{7}-\frac{1}{2}\sqrt{2}+6\sqrt{11}\right)+\left(\frac{1}{3}\sqrt{7}+\frac{3}{2}\sqrt{2}-\sqrt{11}\right)$

4. Rationalize the denominator of the following:

$(i)\ \frac{2}{\sqrt{3}-\sqrt{5}}$ $(ii)\ \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ $(iii)\frac{6}{\sqrt{5}+\sqrt{2}}$ $(iv)\frac{1}{8+5\sqrt{2}}$

$(v)\frac{3-2\sqrt{2}}{3+2\sqrt{2}}$ $(vi)\frac{\sqrt{3}-1}{\sqrt{3}+1}$ $(vii)\frac{4}{\sqrt{7}+\sqrt{3}}$ $(viii)\frac{1}{5+3\sqrt{2}}$

5. Rationalise the denominator of the following:

$(i)\frac{2}{3\sqrt{3}}$ $(ii)\frac{16}{\sqrt{41}-5}$ $(iii)\frac{\sqrt{5}+\sqrt{2}}{\sqrt{5}-\sqrt{2}}$

$(iv)\frac{\sqrt{40}}{\sqrt{3}}$ $(v)\frac{3+\sqrt{2}}{4\sqrt{2}}$ $(vi)\frac{2+\sqrt{3}}{2-\sqrt{3}}$

$(vii)\frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}}$ $(viii)\frac{3\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ $(ix)\frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$

6. If $a=6-\sqrt{35}$, find the value of $a^2+\frac{1}{a^2}$.

7. If $x=3+\sqrt{8}$, find the value of (i) $x^2+\frac{1}{x^2}$ and (ii) $x^4+\frac{1}{x^4}$

8. Simplify, by rationalizing the denominator $\frac{2\sqrt{6}}{\sqrt{2}+\sqrt{3}}+\frac{6\sqrt{2}}{\sqrt{6}+\sqrt{3}}-\frac{8\sqrt{3}}{\sqrt{6}+\sqrt{2}}$

9. Simplify, by rationalizing the denominator

$$\frac{1}{3-\sqrt{8}}-\frac{1}{\sqrt{8}-\sqrt{7}}+\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-2}$$

10. If $x=\frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $y=\frac{\sqrt{2}-1}{\sqrt{2}+1}$, find the value of x^2+y^2+xy.

11. If $x=\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $y=\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, find the value of x^2+y^2.

12. If $x=\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ and $y=\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$, find the value of $x+y+xy$.

13. If $x=\frac{2-\sqrt{5}}{2+\sqrt{5}}$ and $y=\frac{2+\sqrt{5}}{2-\sqrt{5}}$, find the value of x^2-y^2.

14. If $\frac{5+2\sqrt{3}}{7+\sqrt{3}}=a-\sqrt{3}b$, find a and b where a and b are rational numbers.

15. If a and b are rational numbers and $\frac{4+3\sqrt{5}}{4-3\sqrt{5}}=a+b\sqrt{5}$, find the values of a and b.

16. If a and b are rational numbers and $\frac{2+\sqrt{3}}{2-\sqrt{3}}=a+b\sqrt{3}$, find the values of a and b.

17. If a and b are rational numbers and $\frac{\sqrt{11}-\sqrt{7}}{\sqrt{11}+\sqrt{7}}=a-b\sqrt{77}$, find the values of a and b.

18. Evaluate: $\frac{1}{\sqrt{2}+1}+\frac{1}{\sqrt{3}+\sqrt{2}}+\frac{1}{\sqrt{4}+\sqrt{3}}+.....+\frac{1}{\sqrt{9}+\sqrt{8}}$

19. If $x=\frac{1}{2+\sqrt{3}}$, find the value of $2x^3-7x^2-2x+1$.

20. If $x=\frac{1}{2-\sqrt{3}}$, find the value of x^3-2x^2-7x+5.

21. If $\sqrt{2}=1.414$ and $\sqrt{5}=2.236$, find the value of $\frac{\sqrt{10}-\sqrt{5}}{2\sqrt{2}}$ upto three places of decimals.

22. Find six rational numbers between 3 and 4.

23. Find five rational numbers between $\frac{3}{5}$ and $\frac{4}{5}$

24. Find the value of a and b in $\frac{\sqrt{3}-1}{\sqrt{3}+1}=a+b\sqrt{3}$.

25. Find the value of a and b in $\frac{5+2\sqrt{3}}{7+4\sqrt{3}}=a+b\sqrt{3}$

26. Find the value of a and b in $\frac{5-\sqrt{6}}{5+\sqrt{6}}=a-b\sqrt{6}$

27. Simplify $\frac{4+\sqrt{5}}{4-\sqrt{5}}+\frac{4-\sqrt{5}}{4+\sqrt{5}}$ by rationalizing the denominator.

28. Simplify $\frac{\sqrt{5}-1}{\sqrt{5}+1}+\frac{\sqrt{5}+1}{\sqrt{5}-1}$ by rationalizing the denominator.

29. Simplify $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}+\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ by rationalizing the denominator.

30. If x = $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, find (i) $x^2+\frac{1}{x^2}$ (ii) $x^4+\frac{1}{x^4}$.

31. If x = $4-\sqrt{15}$, find (i) $x^2+\frac{1}{x^2}$ (ii) $x^4+\frac{1}{x^4}$.

32. If x = $2+\sqrt{3}$, find (i) $x^2+\frac{1}{x^2}$ (ii) $x^4+\frac{1}{x^4}$.

33. Represent the real number $\sqrt{10}$ on the number line.

34. Represent the real number $\sqrt{13}$ on the number line.

35. Represent the real number $\sqrt{7}$ on the number line.

36. Represent the real number $\sqrt{2},\sqrt{3},\sqrt{5}$ on a single number line.

37. Find two rational number and two irrational number between $\sqrt{2}$ and $\sqrt{3}$.

38. Find the decimal expansions of $\frac{10}{3},\frac{7}{8}$ and $\frac{1}{7}$.

39. Show that 3.142678 is a rational number. In other words, express 3.142678 in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

40. Show that 0.3333……. can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

41. Show that 1.27272727……. can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

42. Show that 0.23535353……. can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

43. Express the following in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

$(i)0.\overline{6}$ $(ii)0.4\overline{7}$ $(iii)0.\overline{001}$ $(iv)0.2\overline{6}$

44. Find three different irrational numbers between the rational numbers $\frac{5}{7}$ and $\frac{9}{11}$.

45. Visualize the representation of $5.3\overline{7}$ using successive magnification

46. Visualize $4.\overline{26}$ on the number line, using successive magnification upto 4 decimal places.

47. Visualize 3.765 on the number line, using successive magnification.

48. Find the value of a and b in each of the following:

$(i)\frac{3+\sqrt{2}}{3-\sqrt{2}}=a+b\sqrt{2}$ $(ii)\frac{3+\sqrt{7}}{3-\sqrt{7}}=a+b\sqrt{7}$ $(iii)\frac{7+\sqrt{5}}{7-\sqrt{5}}=a+b\sqrt{5}$

49. Simplify each of the following by rationalizing the denominator.

$(i)\frac{6-4\sqrt{2}}{6+4\sqrt{2}}$ $(ii)\frac{\sqrt{5}-2}{\sqrt{5}+2}-\frac{\sqrt{5}+2}{\sqrt{5}-2}$

50. Evaluate the following expressions:

$(i)\left(\frac{256}{6561}\right)^{\frac{3}{8}}$ $(ii)\left(15625\right)^{\frac{1}{6}}$ $(iii)\left(\frac{343}{1331}\right)^{\frac{1}{3}}$

$(iv)\sqrt[8]{\frac{6561}{65536}}$ $(v)343^{-\frac{1}{3}}$

51. Simplify: $\frac{\sqrt{32}+\sqrt{48}}{\sqrt{8}+\sqrt{12}}$

52. Simplify: $\frac{7}{3\sqrt{3}-2\sqrt{2}}$

53. Simplify: $(i)\ \sqrt[4]{\sqrt[3]{2^2}}$ $(ii)\sqrt[3]{2}.\sqrt[4]{2}.\sqrt[12]{32}$

54. If $\sqrt{2}=1.4142$, then find the value of $\sqrt{\frac{\sqrt{2}+1}{\sqrt{2}-1}}$.

55. If $\sqrt{3}=1.732$, then find the value of $\sqrt{\frac{\sqrt{3}+1}{\sqrt{3}-1}}$.

56. Find the value of a if $\frac{6}{3\sqrt{2}-2\sqrt{3}}=3\sqrt{2}-a\sqrt{3}$

57. Evaluate the following expressions:

$(i)\left(\frac{625}{81}\right)^{-\frac{1}{4}}$ $(ii)27^{\frac{2}{3}}\times27^{\frac{1}{3}}\times27^{-\frac{4}{3}}$ $(iii)(6.25)^{\frac{3}{2}}$

$(iv)(0.000064)^{\frac{5}{6}}$ $(v)\left(17^2-8^2\right)^{\frac{1}{2}}$

58. Express $0.6+0.\overline{7}+0.4\overline{7}$ in the form of $\frac{p}{q}$, where p and q are integers and $q\neq0$.

59. Simplify: $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}}-\frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}}-\frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$

60. If $\sqrt{2}=1.414,\sqrt{3}=1.732$, then find the value of $\frac{4}{3\sqrt{3}-2\sqrt{2}}+\frac{3}{3\sqrt{3}+2\sqrt{2}}$.

61. Simplify:

$(i)\left[5\left(8^{\frac{1}{3}}+27^{\frac{1}{3}}\right)^3\right]^{\frac{1}{4}}$ $(ii)\sqrt{45}-3\sqrt{20}+4\sqrt{5}$ $(iii)\frac{\sqrt{24}}{8}+\frac{\sqrt{54}}{9}$

$(iv)\sqrt[4]{12}\times\sqrt[6]{7}$ $(v)\sqrt[4]{28}\div\sqrt[3]{7}$ $(vi)\sqrt[3]{3}+2\sqrt{27}+\frac{1}{\sqrt{3}}$

$(vii)\left(\sqrt{3}-\sqrt{5}\right)^2$ $(viii)\sqrt[4]{81}-8\sqrt[3]{216}+15\sqrt[5]{32}+\sqrt{225}$

$(ix)\frac{3}{\sqrt{8}}+\frac{1}{\sqrt{2}}$ $(x)\frac{\sqrt[2]{3}}{3}-\frac{\sqrt{3}}{6}$

62. If $a=\frac{3+\sqrt{5}}{2}$ then find the value of $a^2+\frac{1}{a^2}$.

63. Simplify: $\left(256\right)^{\left(-4^{\frac{-3}{2}}\right)}$

64. Find the value of $\frac{4}{(216)^{\frac{-2}{3}}}+\frac{1}{(256)^{\frac{-3}{4}}}+\frac{2}{(243)^{\frac{-1}{5}}}$

65. If $a=5+2\sqrt{6}$ and $b=\frac{1}{a}$ then what will be the value of $a^2 + b^2$?

66. Find the value of a and b in each of the following:

$(i)\dfrac{3-\sqrt{5}}{3+2\sqrt{5}}=a\sqrt{5}-\dfrac{19}{11}$

$(ii)\dfrac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}}=2-b\sqrt{6}$

$(iii)\dfrac{7+\sqrt{5}}{7-\sqrt{5}}-\dfrac{7-\sqrt{5}}{7+\sqrt{5}}=a+\dfrac{7}{11}b\sqrt{5}$

67. If $a=2+\sqrt{3}$, then find the value of $a-\dfrac{1}{a}$.

68. Rationalise the denominator in each of the following and hence evaluate by taking $\sqrt{2}=1.414, \sqrt{3}=1.732$ and $\sqrt{5}=2.236$, upto three places of decimal.

$(i)\dfrac{4}{\sqrt{3}}$ $(ii)\dfrac{6}{\sqrt{6}}$ $(iii)\dfrac{\sqrt{10}-\sqrt{5}}{2}$ $(iv)\dfrac{\sqrt{2}}{2+\sqrt{2}}$ $(v)\dfrac{1}{\sqrt{3}+\sqrt{2}}$

69. Simplify:

$(i)\left(1^3+2^3+3^3\right)^{\frac{1}{2}}$ $(ii)\left(\dfrac{3}{5}\right)^4\left(\dfrac{8}{5}\right)^{-12}\left(\dfrac{32}{5}\right)^6$ $(iii)\left(-\dfrac{1}{27}\right)^{\frac{-2}{3}}$

$(iv)\left[\left((625)^{\frac{-1}{2}}\right)^{\frac{-1}{4}}\right]^2$ $(v)\dfrac{8^{\frac{1}{3}}\times 16^{\frac{1}{3}}}{32^{\frac{-1}{3}}}$ $(vi)64^{\frac{-1}{3}}\left[64^{\frac{1}{3}}-64^{\frac{2}{3}}\right]$

70. Simplify: $\dfrac{9^{\frac{1}{3}}\times 27^{\frac{-1}{2}}}{3^{\frac{1}{6}}\times 3^{\frac{-2}{3}}}$

MCQ WORKSHEET-I
CLASS IX : CHAPTER - 3
COORDINATE GEOMETRY

1. Point (–3, –2) lies in the quadrant:
(a) I (b) II (c) III (d) IV

2. Point (5, –4) lies in the quadrant:
(a) I (b) II (c) III (d) IV

3. Point (1, 7) lies in the quadrant:
(a) I (b) II (c) III (d) IV

4. Point (–6, 4) lies in the quadrant:
(a) I (b) II (c) III (d) IV

5. The point (–4, –3) means:
(a) x = –4, y = –3 (b) x = –3, y = –4 (c) x = 4, y = 3 (d) None of these

6. Point (0, 4) lies on the:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

7. Point (5, 0) lies on the:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

8. On joining points (0, 0), (0, 2), (2,2) and (2, 0) we obtain a:
(a) Square (b) Rectangle (c) Rhombus (d) Parallelogram

9. Point (–2, 3) lies in the:
(a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant

10. Point (0, –2) lies:
(a) on the x-axis (b) in the II quadrant (c) on the y-axis (d) in the IV quadrant

11. Signs of the abscissa and ordinate of a point in the first quadrant are respectively:
(a) +, + (b) –, + (c) +, – (d) –, –

12. Signs of the abscissa and ordinate of a point in the second quadrant are respectively:
(a) +, + (b) –, + (c) +, – (d) –, –

13. Signs of the abscissa and ordinate of a point in the third quadrant are respectively:
(a) +, + (b) –, + (c) +, – (d) –, –

14. Signs of the abscissa and ordinate of a point in the fourth quadrant are respectively:
(a) +, + (b) –, + (c) +, – (d) –, –

15. Point (–1, 0) lies in the:
(a) on the negative direction of x – axis (b) on the negative direction of y – axis
(c) in the III quadrant (d) in the IV quadrant

MCQ WORKSHEET-II
CLASS IX : CHAPTER - 3
COORDINATE GEOMETRY

1. Point (0, –2) lies in the:
(a) on the negative direction of x – axis (b) on the negative direction of y – axis
(c) in the I quadrant (d) in the II quadrant

2. Abscissa of the all the points on x – axis is:
(a) 0 (b) 1 (c) –1 (d) any number

3. Ordinate of the all the points on x – axis is:
(a) 0 (b) 1 (c) –1 (d) any number

4. Abscissa of the all the points on y – axis is:
(a) 0 (b) 1 (c) –1 (d) any number

5. Ordinate of the all the points on y – axis is:
(a) 0 (b) 1 (c) –1 (d) any number

6. A point both of whose coordinates are negative will lie in:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

7. A point both of whose coordinates are positive will lie in:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

8. If y – coordinate of a point is zero, then this point always lies:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

9. If x – coordinate of a point is zero, then this point always lies:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

10. The point (1, –1), (2, –2), (4, –5), (–3,–4) lies in:
(a) II quadrant (b) III quadrant (c) IV quadrant
(d) do not lie in the same quadrant

11. The point (1, –2), (2, –3), (4, –6), (2,–7) lies in:
(a) II quadrant (b) III quadrant (c) IV quadrant
(d) do not lie in the same quadrant

12. The point (–5, 2) and (2,–5) lies in:
(a) same quadrant (b) II and III quadrant, respectively
(c) II and IV quadrant, , respectively (d) IV and II quadrant, respectively

13. The point whose ordinate is 4 and which lies on y – axis is:
(a) (4, 0) (b) (0, 4) (c) (1, 4) (d) (4, 2)

14. Abscissa of a point is positive in:
(a) I and II quadrant (b) I and IV quadrant
(c) I quadrant only (d) II quadrant only

15. The perpendicular distance of the point P(3,4) from the y – axis is:
(a) 3 (b) 4 (c) 5 (d) 7

MCQ WORKSHEET-III
CLASS IX : CHAPTER - 3
COORDINATE GEOMETRY

1. The point (–2, –5) lies in the
(a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant

2. The sign of x-coordinate of a point lying in third quadrant is
(a) + (b) – (c) ± (d) IV quadrant

3. The signs of respective x-coordinate and y-coordinates of a point lying 2nd quadrant are
(a) –, + (b) –, – (c) +, – (d) +, +

4. The point (0, 4) lies on
(a) I quadrant (b) negative x – axis (c) positive x – axis (d) y – axis

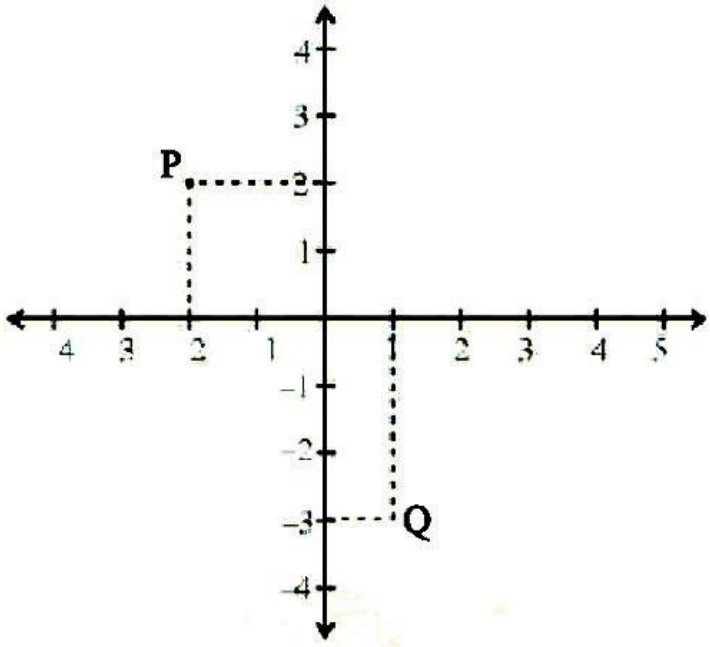
5. The y-coordinate of any point lying on x-axis is
(a) 0 (b) 1 (c) –1 (d) any number

6. The point where the two axes meet, is called
(a) x-coordinate (b) y- coordinate (c) quadrant (d) origin

7. The point (–5, 4) and (4, –5) are situated in
(a) same quadrant (b) I and III quadrant, respectively
(c) Different quadrants (d) IV and II quadrant, respectively

8. The figure obtained by plotting the points (2, 3), (–2, 3),(–2, –3) and (2, –3) is a
(a) trapezium (b) rectangle (c) square (d) rhombus

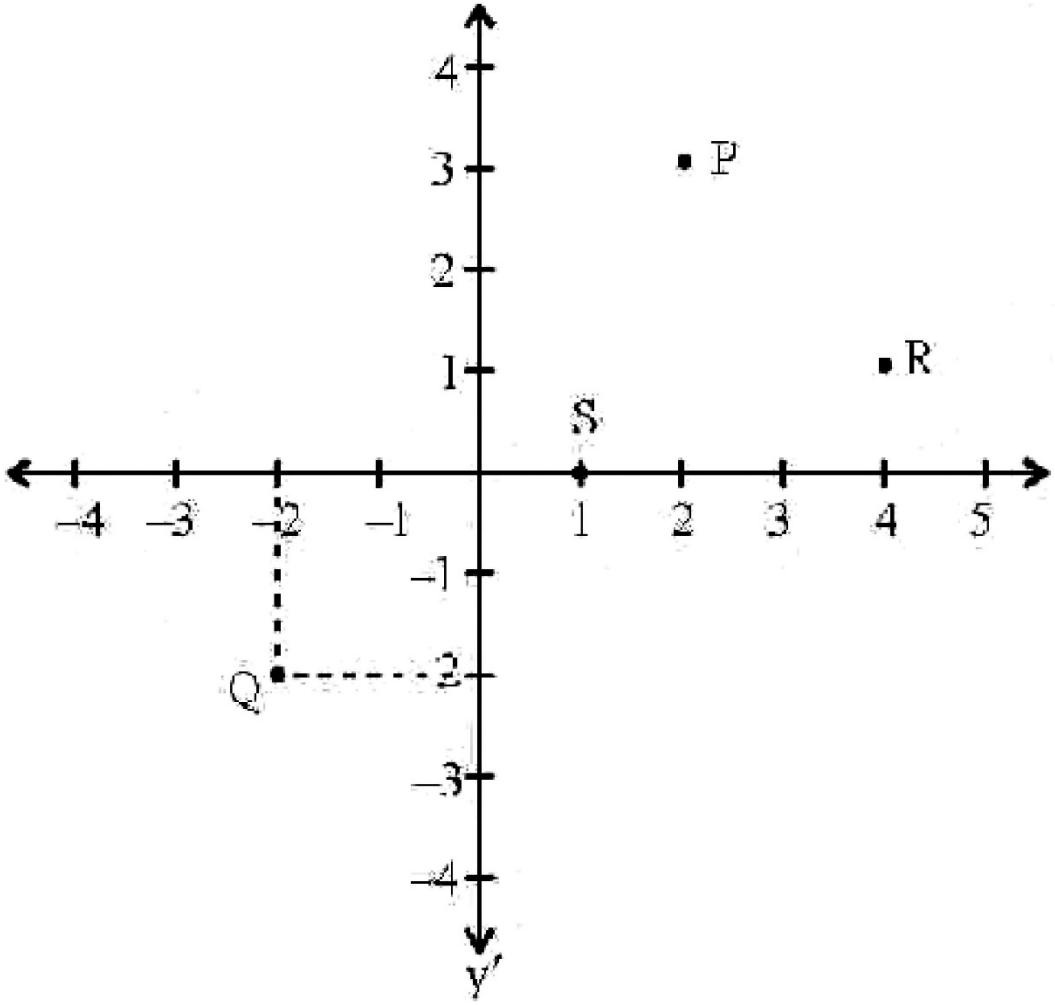
9. In the given figure, on the sides the respective coordinates of points P and Q respectively are:
(a) (–2, –2), (1, 3) (b) (–2, –2), (–1, 3) (c) (–2, 2), (1, –3) (d) (–2, 2), (1, 3)



10. The point (0, –3) lies on
(a) negative side of y – axis (b) negative side of x – axis
(c) positive side of x – axis (d) positive side of y – axis

11. If the coordinates of two points P and Q are (2, –3) and (–6, 5), then the value of (x-coordinate of P) – (x-coordinate of Q) is
(a) 2 (b) –6 (c) –8 (d) 8

12. The point whose y-coordinate is 3 in the given figure is
(a) P (b) Q (c) R (d) S



13. The coordinates of the point lying on the negative side of x-axis at a distance of 5 units from origin are
(a) (0, 5) (b) (0, –5) (c) (–5, 0) (d) (5, 0)

14. The distance of the (4, –3) from x – axis is
(a) 3 units (b) –3 units (c) 4 units (d) 5 units

15. The origin lies on
(a) x-axis only (b) both axes (c) y-axis only (d) none of the axes

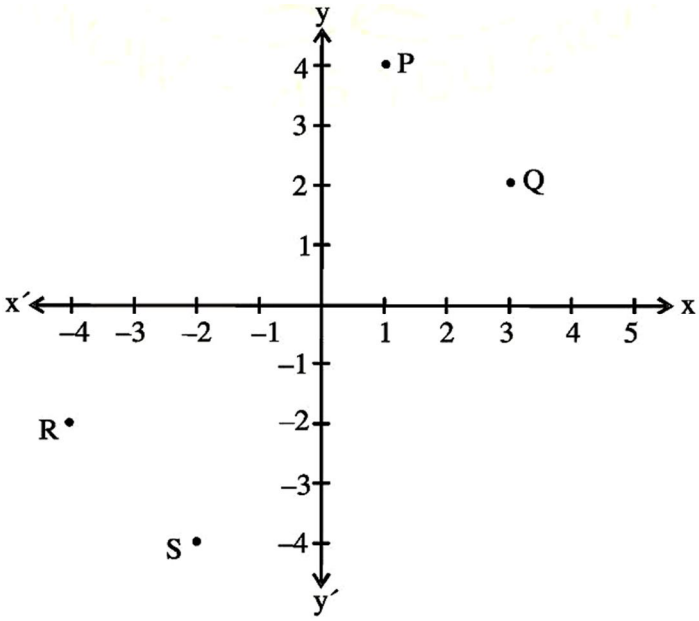
PRACTICE QUESTIONS
CLASS IX : CHAPTER - 3
COORDINATE GEOMETRY

1. Which of the following points lie in I and II quadrants?
(1, 1), (2, –3), (–2, 3), (-1, 1), (–3, –2), (4, 3)

2. Which of the following points lie on (a) x-axis (b) y-axis?
(5, 1), (8, 0), (0, 4), (–3, 0), (0, –3), (0, 5), (0, 0)

3. If the x-coordinate of a point is negative, it can lie in which quadrants?

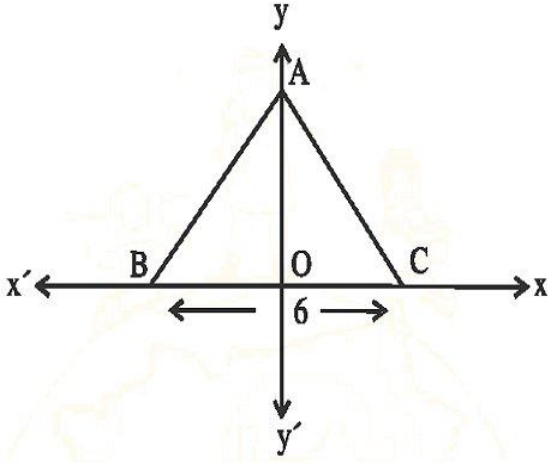
4. From the figure, write the coordinates of the point P, Q, R and S. Does the line joining P and Q pass through origin?



5. Write the coordinates of the following points:
(i) lying on both axes
(ii) lying on x-axis and with x-coordinate 4
(iii) lying on y-axis with y-coordinate –3.

6. The coordinates of the three vertices of a rectangle ABCD are A(3, 2), B(–4, 2), C(–4, 5). Plot these points and write the coordinates of D.

7. ABC is an equilateral triangle as shown in the figure. Find the coordinates of its vertices.



8. Plot the following points on a graph paper:

x	1	2	3	4	5
y	5	8	11	14	17

Join these points. What do you observe?

9. What is the name of horizontal and the vertical lines drawn to determine the position of any point in the Cartesian plane?

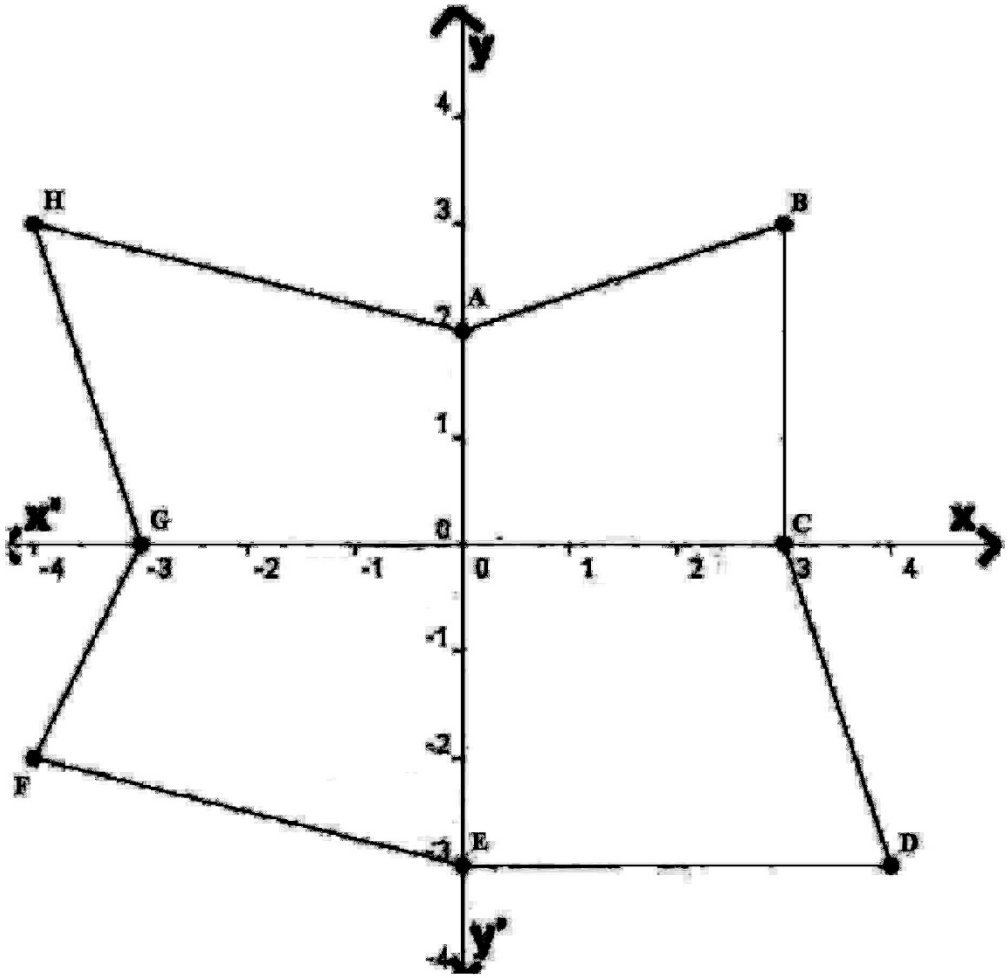
10. What is the name of each part of the plane formed by these two lines?

11. Write the name of the point where these two lines intersect.

12. Locate the points (5, 0), (0, 5), (2, 5), (5, 2), (–3, 5), (–3, –5), (5, –3) and (6, 1) in the Cartesian plane.

13. Draw the line passing through (2, 3) and (3, 2). Find the coordinates of the points at which this line meets the *x*-axis and *y*-axis.

14. Locate the coordinates of labelled points A, B, C, D, E, F, G and H in the following diagram:

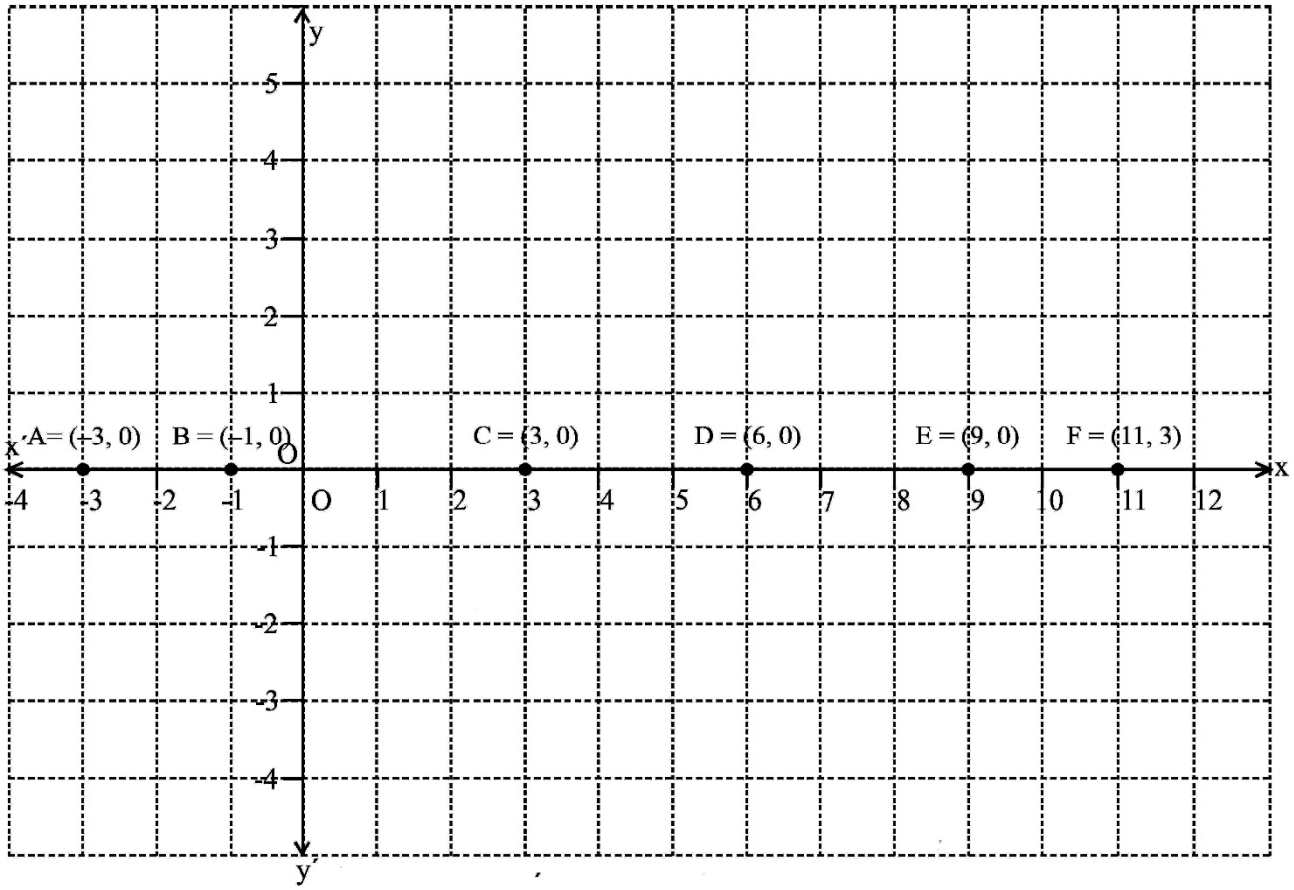


15. Plot the following ordered pairs of number (*x*, *y*) as points in the Cartesian plane. Use the scale 1cm = 1 unit on the axes.

x	–3	0	–1	4	2
y	7	–3.5	–3	4	–3

16. In which quadrant or on which axis do each of the points (– 2, 4), (3, – 1), (– 1, 0), (1, 2) and (– 3, – 5) lie? Verify your answer by locating them on the Cartesian plane.

17. Read the given graph and answer the following questions:



(a) Complete the table given below

Point	Location	Coordinates	Abscissa	Ordinates
A				
B				
C				
D				
E				
F				

(b) What are the coordinates of a general point on the x-axis?

18. Plot the points (x, y) given in the following table on the plane, choosing suitable units of distance on the axes.

x	–1	2	–4	2	–3
y	0	–5	2	1	2

19. Plot the following points and verify if they lie on a line. If they lie on a line, name it.

(i) (0, 2), (0, 5), (0, 6), (0, 3.5)

(ii) A (1, 1), B (1, 2), C (1, 3), D (1, 4)

(iii) K (1, 3), L (2, 3), M (3, 3), N (4, 3)

(iv) W (2, 6), X (3, 5), Y (5, 3), Z (6, 2)

20. Plot the following points on a graph sheet. Verify if they lie on a line

(a) A(4, 0), B(4, 2), C(4, 6), D(4, 2.5)

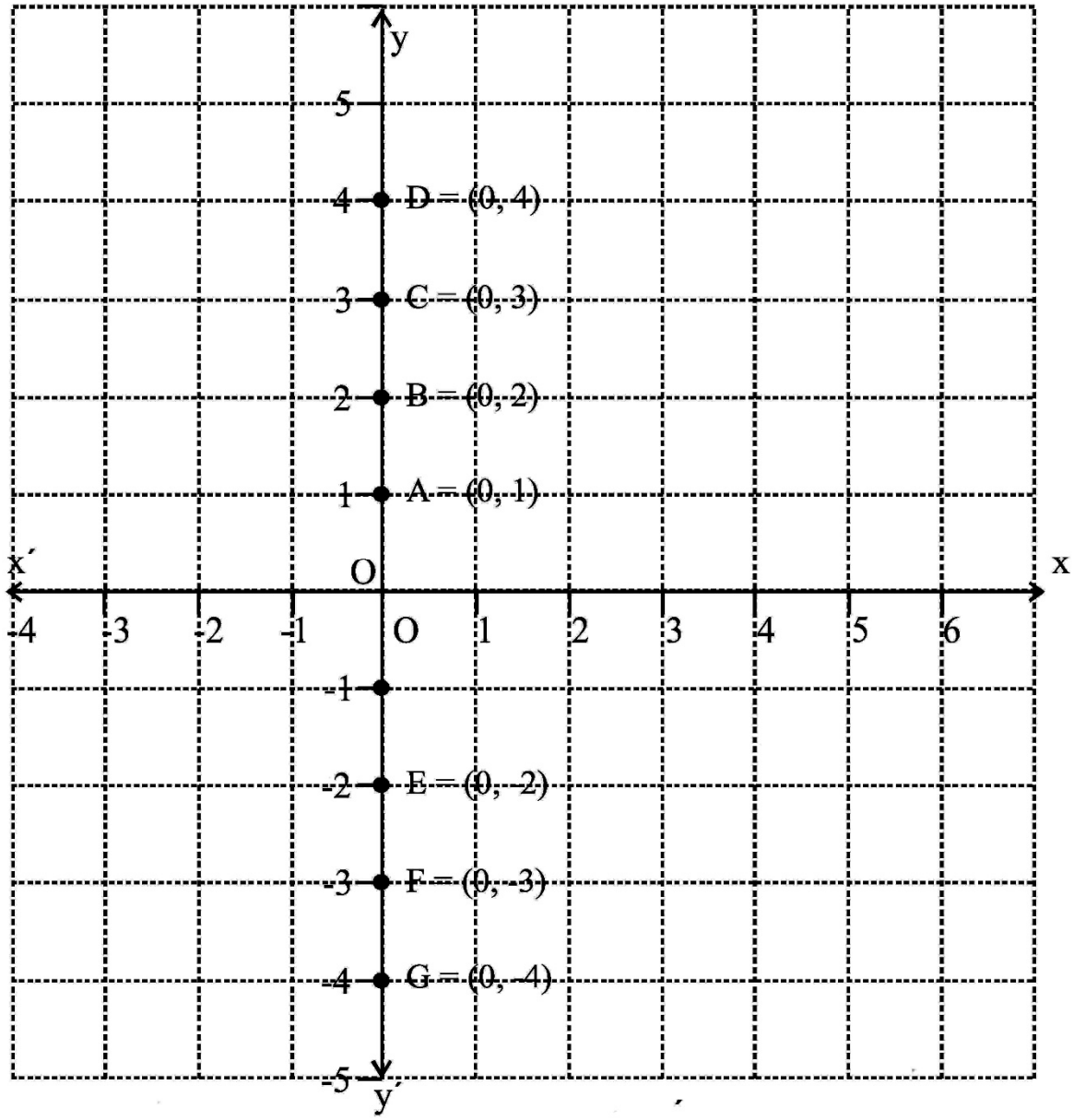
(b) P(1, 1), Q(2, 2), R(3, 3), S(4, 4)

(c) K(2, 3), L(5, 3), M(5, 5), N(2, 5)

21. In which quadrant or on which axis do each of the points (5, 0), (0, 5), (2, 5), (5, 2), (–3, 5), (–3, –5), (5, –3) and (6, 1) in the Cartesian plane.

22. Plot the points A (4, 4) and (–4, 4) on a graph sheet. Join the lines OA, OB and BA. What figure do you obtain.

23. Read the given graph and answer the following questions:



(a) Complete the table given below

Point	Location	Coordinates	Abscissa	Ordinates
A				
B				
C				
D				
E				
F				

(b) What are the coordinates of a general point on the y-axis?

24. Plot the point P (– 6, 2) and from it draw PM and PN as perpendiculars to *x*-axis and *y*-axis, respectively. Write the coordinates of the points M and N.

25. Plot the following points and write the name of the figure thus obtained : P(–3, 2), Q (–7, –3), R (6, –3), S (2, 2)

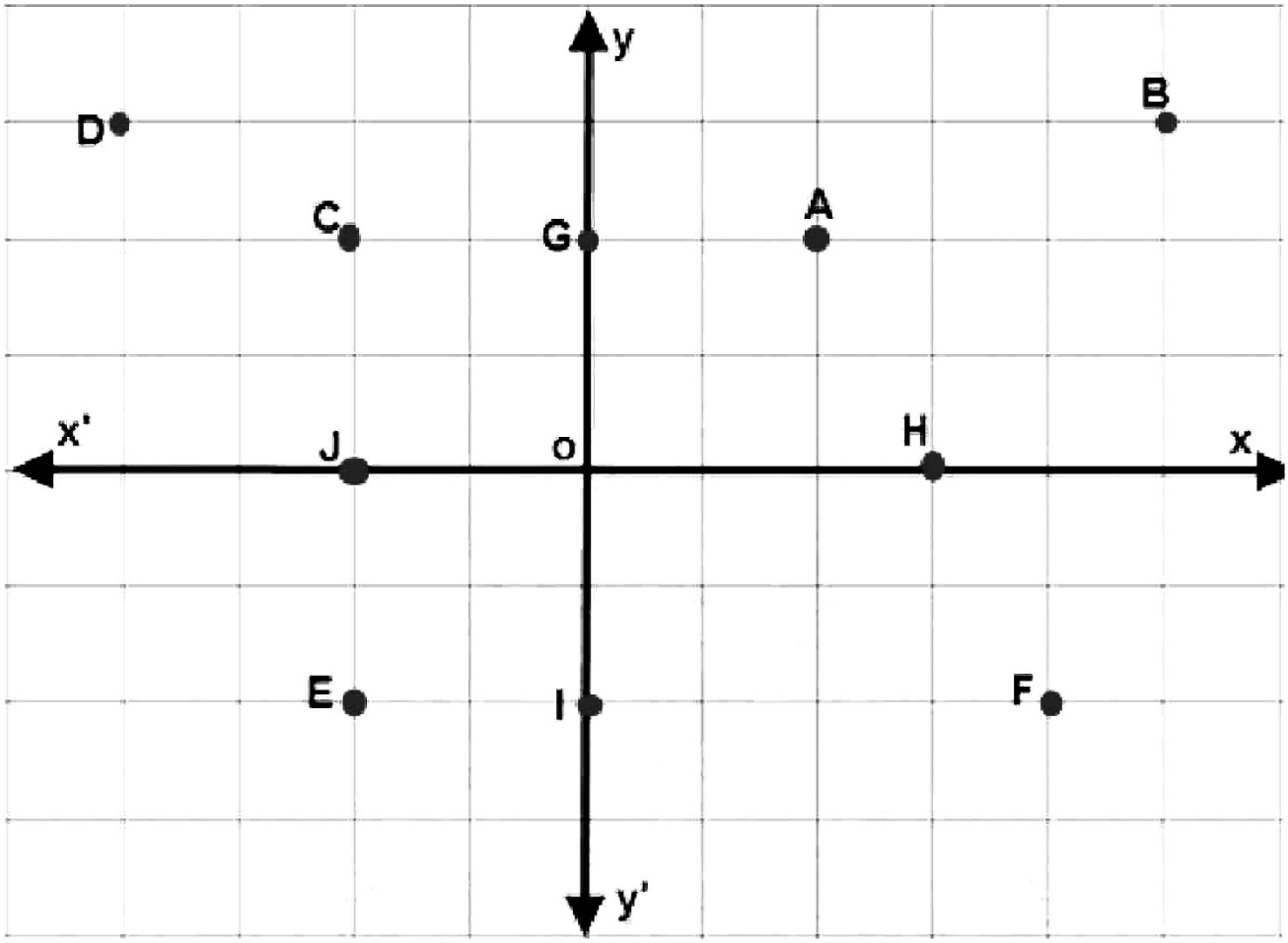
26. Plot the following points and check whether they are collinear or not :

(i) (1, 3), (– 1, – 1), (– 2, – 3)

(ii) (1, 1), (2, – 3), (– 1, – 2)

(iii) (0, 0), (2, 2), (5, 5)

27. Locate the position of marked points.



28. Complete the following table by putting a tick or a cross for the given points and their location.

Point	I quadrant	II quadrant	III quadrant	IV quadrant	x-axis	y-axis
(0, 0)						
(1, 2)						
(1, –2)						
(–2, 1)						
(–1, –2)						
(0, –2)						
(–2, 0)						
(7, 9)						

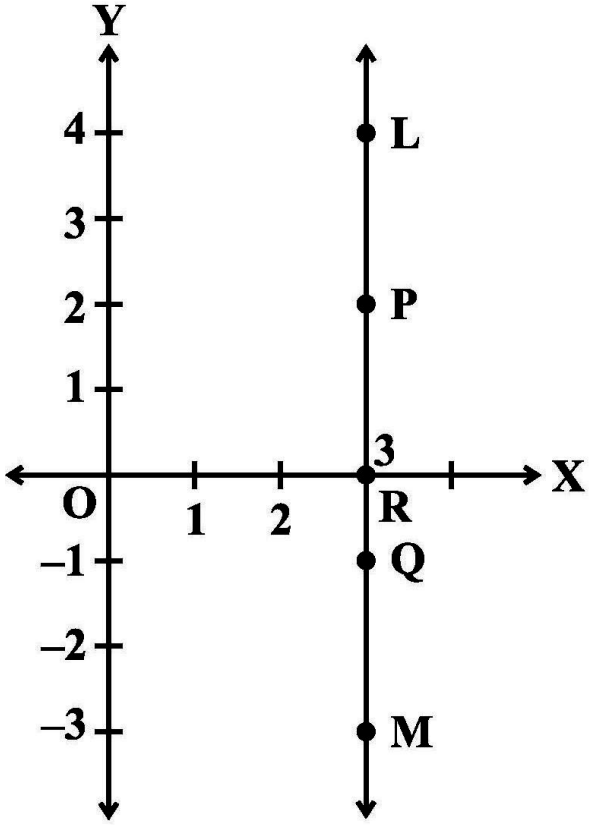
29. Plot the points (x, y) given by the following table:

x	2	4	–3	–2	3	0
y	4	2	0	5	–3	0

30. Without plotting the points indicate the quadrant in which they will lie, if
(i) ordinate is 5 and abscissa is – 3
(ii) abscissa is – 5 and ordinate is – 3
(iii) abscissa is – 5 and ordinate is 3
(iv) ordinate is 5 and abscissa is 3

31. In which quadrant or on which axis each of the following points lie?
(– 3, 5), (4, – 1), (2, 0), (2, 2), (– 3, – 6)

32. In the below Figure, LM is a line parallel to the *y*-axis at a distance of 3 units.
(i) What are the coordinates of the points P, R and Q?
(ii) What is the difference between the abscissa of the points L and M?



33. Which of the following points lie on *y*-axis?
A (1, 1), B (1, 0), C (0, 1), D (0, 0), E (0, – 1), F (– 1, 0), G (0, 5), H (–7, 0), I (3, 3).

34. Plot the points (*x*, *y*) given by the following table. Use scale 1 cm = 0.25 units

x	1.25	0.25	1.5	–1.75
y	–0.5	1	1.5	–0.25

35. A point lies on the *x*-axis at a distance of 7 units from the *y*-axis. What are its coordinates? What will be the coordinates if it lies on *y*-axis at a distance of –7 units from *x*-axis?

36. Find the coordinates of the point
(i) which lies on *x* and *y* axes both.
(ii) whose ordinate is – 4 and which lies on *y*-axis.
(iii) whose abscissa is 5 and which lies on *x*-axis.

37. Taking 0.5 cm as 1 unit, plot the following points on the graph paper : A (1, 3), B (– 3, – 1), C (1, – 4), D (– 2, 3), E (0, – 8), F (1, 0)

38. Plot the points P (1, 0), Q (4, 0) and S (1, 3). Find the coordinates of the point R such that PQRS is a square.

39. Three vertices of a rectangle are (3, 2), (– 4, 2) and (– 4, 5). Plot these points and find the coordinates of the fourth vertex.

40. Three vertices of a rectangle are (4, 2), (– 3, 2) and (– 3, 7). Plot these points and find the coordinates of the fourth vertex.

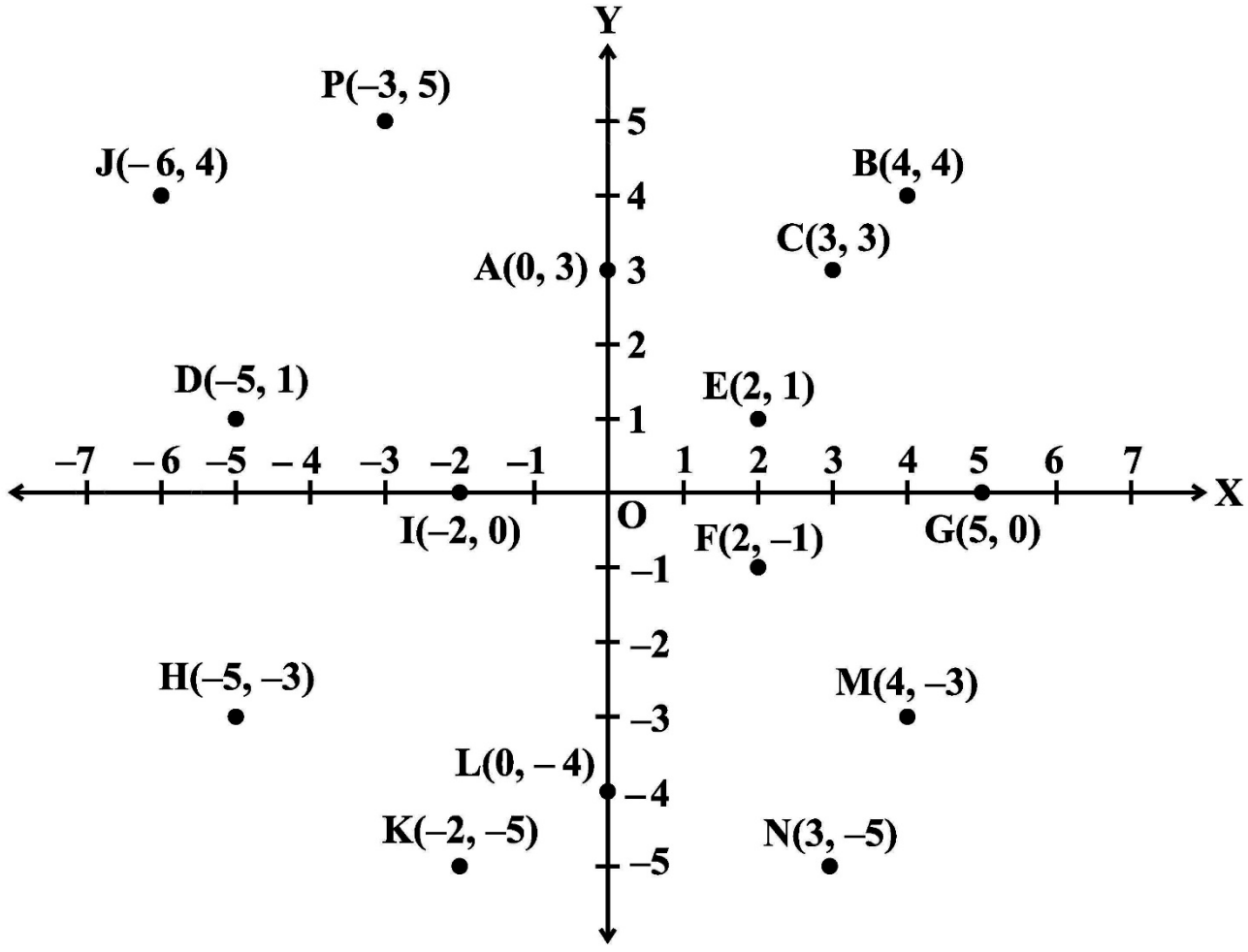
41. Points A (5, 3), B (– 2, 3) and D (5, – 4) are three vertices of a square ABCD. Plot these points on a graph paper and hence find the coordinates of the vertex C.

42. Write the coordinates of the vertices of a rectangle whose length and breadth are 5 and 3 units respectively, one vertex at the origin, the longer side lies on the *x*-axis and one of the vertices lies in the third quadrant.

43. Plot the points A (1, – 1) and B (4, 5) (i) Draw a line segment joining these points. Write the coordinates of a point on this line segment between the points A and B. (ii) Extend this line segment and write the coordinates of a point on this line which lies outside the line segment AB.

44. Plot the points P (0, –3), Q (0, 3) and R (6, 3). Find the coordinates of the point S such that PQRS is a square.

45. From the below graph, answer the following : (i) Write the points whose abscissa is 0. (ii) Write the points whose ordinate is 0. (iii) Write the points whose abscissa is – 5.



MCQ WORKSHEET-I
CLASS IX: CHAPTER – 4
LINEAR EQUATION IN TWO VARIABLES

1. The solution of the equation x – 2y = 4 is:
(a) (0, 2) (b) (4, 0) (c) (1, 1) (d) (2, 0)

2. In graphical representation of y = – 4, line is:
(a) parallel to x – axis (b) parallel to y – axis
(c) passes through origin (d) None of these.

3. Solution of the equation 2x + 1 = x + 3 is:
(a) 3 (b) 1 (c) 2 (d) 4

4. The graph of line x – y = 0 passes through:
(a) (2, 3) (b) (3, 4) (c) (5, 6) (d) (0, 0)

5. The graph of line x + y = 7 intersect the x-axis at:
(a) (7, 0) (b) (0, 7) (c) (–7, 0) (d) (0, –7)

6. Point (4, 1) lies on the line:
(a) x + 2y = 5 (b) x + 2y = –6 (c) x + 2y = 6 (d) x + 2y = 16

7. Graph of x = 2 is a line:
(a) parallel to x – axis (b) parallel to y – axis
(c) passes through origin (d) None of these.

8. The linear equation 2x – 5y = 7 has
(a) a unique solution (b) two solutions
(c) infinitely many solutions (d) no solutions.

9. The equation 2x + 5y = 7 has a unique solution, if x, y are:
(a) natural numbers (b) positive numbers
(c) real numbers (d) rational numbers.

10. If (2, 0) is a solution of the linear equation 2x + 3y = k, then the value of k is
(a) 4 (b) 6 (c) 5 (d) 2

11. Any solution of the linear equation 2x + 0y + 9 = 0 in two variables is of the form
(a) $(-\frac{9}{2}, m)$ (b) $(n, -\frac{9}{2})$ (c) $(0, -\frac{9}{2})$ (d) (–9, 0)

12. The graph of the linear equation 2x + 3y = 6 cuts the y-axis at the point
(a) (2, 0) (b) (0, 3) (c) (3, 0) (d) (0, 2)

13. The equation x = 7, in two variables, can be written as
(a) x + 0y = 7 (b) 0x + y = 7 (c) 0x + 0y = 7 (d) x + y = 7

14. Any point on the x – axis is of the form
(a) (x, y) (b) (0, y) (c) (x, 0) (d) (x, x)

MCQ WORKSHEET-II
CLASS IX: CHAPTER – 4
LINEAR EQUATION IN TWO VARIABLES

1. Any point on the y = x is of the form
(a) (a, a) (b) (0, a) (c) (a, 0) (d) (a, –a)

2. The equation of x –axis is of the form
(a) x = 0 (b) y = 0 (c) x + y = 0 (d) x = y

3. Graph of y = 6 is a line:
(a) parallel to x – axis at a distance 6 units from the origin
(b) parallel to y – axis at a distance 6 units from the origin
(c) making an intercept 6 on the x –axis.
(d) making an intercept 6 on both the axes.

4. x=5, y=2 is a solution of the linear equation
(a) x + 2y = 7 (b) 5x + 2y = 7 (c) x + y = 7 (d) 5x + y = 7

5. If a linear equation has solutions (–2, 2), (0, 0) and (2, –2), then its is of the form
(a) y – x = 0 (b) x + y = 0 (c) –2x + y = 0 (d) –x + 2y = 0

6. The positive solutions of the equation is ax + by + c = 0 always lie in the
(a) 1^{st} quadrant (b) 2^{nd} quadrant (c) 3^{rd} quadrant (d)4^{th} quadrant

7. The graph of the linear equation 2x + 3y = 6 is a line which meets the x axis at the point
(a) (2, 0) (b) (0, 3) (c) (3, 0) (d) (0, 2)

8. The graph of the y = x passes through the point
(a) $\left(\frac{3}{2},-\frac{3}{2}\right)$ (b) $\left(0,\frac{3}{2}\right)$ (c) (1, 1) (d) $\left(\frac{-1}{2},\frac{1}{2}\right)$

9. If we multiply or divide both sides of a linear equation with a non-zero number, then the solution of the linear equation:
(a) changes (b) remains the same
(c) changes in case of multiplication only (d) changes in case of division only

10. How many linear equation in x and y can be satisfied by x = 1 and y = 2?
(a) only one (b) two (c) infinitely many (d) three

11. The point of the form (a, a) always lies on:
(a) x – axis (b) y – axis (c) on the line y = x (d) on the x + y =0

12. The point of the form (a, –a) always lies on:
(a) x = a (b) y = –a (c) y = x (d) x + y =0

MCQ WORKSHEET-III
CLASS IX: CHAPTER – 4
LINEAR EQUATION IN TWO VARIABLES

1. Which of the following is not a linear equation in two variables?
(a) $ax + by = c$ (b) $ax^2 + by = c$ (c) $2x + 3y = 5$ (d) $3x + 2y = 6$

2. The graph of $ax + by + c = 0$ is
(a) a straight line parallel to x–axis (b) a straight line parallel to y–axis
(c) a general straight line (d) a line in the 2^{nd} and 3^{rd} quadant

3. The solution of a linear equation in two variables is
(a) a number which satisfies the given equation
(b) an ordered pair which satisfies the given equation
(c) an ordered pair, whose respective values when substituted for x and y in the given equation, satisfies it
(d) none of these

4. One of the solution of a linear equation in two variables is
(a) (3, 2) (b) (3, –2) (c) (2, 3) (d) (–2, –3)

5. The ordered pair (m, n) satisfies the equation $ax + by + c = 0$ if
(a) $am + bn = 0$ (b) $c = 0$ (c) $am + bn + c = 0$ (d) $am + bn – c = 0$

6. The equation of x – axis is
(a) $a = 0$ (b) $y = 0$ (c) $x = 0$ (d) $y = k$

7. From the graph of a line, we can find the coordinates of
(a) only two point lying on the line
(b) only two points only lying on the line.
(c) only finite number of points lying on the line.
(d) only infinite number of points lying on the line.

8. A linear equation in two variables has
(a) no solution (b) only one solution (c) only two solutions (d) infinitely many solutions

9. An equation of the form $ax + by + c = 0$ represents a linear equation in two variables, if
(a) $a = 0, b \neq 0$ (b) $a \neq 0, b = 0$ (c) $a = 0, b = 0$ (d) $a = 0, b \neq 0$

10. The graph of the linear equation in two variables $y = mx$ is
(a) a line parallel to x – axis (b) a line parallel to y – axis
(c) a line passing through the origin (d) not a straight line

PRACTICE QUESTIONS
CLASS IX: CHAPTER – 4
LINEAR EQUATION IN TWO VARIABLES

1. Find the value of k, if $x = 2$, $y = 1$ is a solution of the equation $2x + 3y = k$.

2. Find the points where the graph of the equation $3x + 4y = 12$ cuts the x-axis and the y-axis.

3. At what point does the graph of the linear equation $x + y = 5$ meet a line which is parallel to the y-axis, at a distance 2 units from the origin and in the positive direction of x-axis.

4. Determine the point on the graph of the equation $2x + 5y = 20$ whose x-coordinate is $\frac{5}{2}$ times its ordinate.

5. Draw the graph of the equation represented by the straight line which is parallel to the x-axis and is 4 units above it.

6. Draw the graphs of linear equations $y = x$ and $y = -x$ on the same cartesian plane. What do you observe?

7. Determine the point on the graph of the linear equation $2x + 5y = 19$, whose ordinate is $1\frac{1}{2}$ times its abscissa.

8. Draw the graph of the equation represented by a straight line which is parallel to the x-axis and at a distance 3 units below it.

9. Draw the graph of the linear equation whose solutions are represented by the points having the sum of the coordinates as 10 units.

10. Write the linear equation such that each point on its graph has an ordinate 3 times its abscissa.

11. If the point (3, 4) lies on the graph of $3y = ax + 7$, then find the value of a.

12. How many solution(s) of the equation $2x + 1 = x - 3$ are there on the : (i) Number line (ii) Cartesian plane

13. Find the solution of the linear equation $x + 2y = 8$ which represents a point on (i) x-axis (ii) y-axis

14. For what value of c, the linear equation $2x + cy = 8$ has equal values of x and y for its solution.

15. Let y varies directly as x. If $y = 12$ when $x = 4$, then write a linear equation. What is the value of y when $x = 5$?

16. Draw the graph of the linear equation $2x + 3y = 12$. At what points, the graph of the equation cuts the x-axis and the y-axis?

17. Show that the points A (1, 2), B (– 1, – 16) and C (0, – 7) lie on the graph of the linear equation $y = 9x - 7$.

18. The following values of x and y are thought to satisfy a linear equation :

x	1	2
y	1	3

Draw the graph, using the values of x, y as given in the above table. At what point the graph of the linear equation (i) cuts the x-axis. (ii) cuts the y-axis.

19. The Autorikshaw fare in a city is charged Rs 10 for the first kilometer and @ Rs 4 per kilometer for subsequent distance covered. Write the linear equation to express the above statement. Draw the graph of the linear equation.

20. The work done by a body on application of a constant force is the product of the constant force and the distance travelled by the body in the direction of force. Express this in the form of a linear equation in two variables and draw its graph by taking the constant force as 3 units. What is the work done when the distance travelled is 2 units. Verify it by plotting the graph.

21. The following values of x and y are thought to satisfy a linear equation, Write the linear equation.

x	6	–6
y	–6	6

Draw the graph, using the values of x, y as given in the above table. At what point the graph of the linear equation (i) cuts the x-axis. (ii) cuts the y-axis.

22. Draw the graph of the linear equation $3x + 4y = 6$. At what points, the graph cuts the x-axis and the y-axis.

23. The force exerted to pull a cart is directly proportional to the acceleration produced in the body. Express the statement as a linear equation of two variables and draw the graph of the same by taking the constant mass equal to 6 kg. Read from the graph, the force required when the acceleration produced is (i) 5 m/sec^2, (ii) 6 m/sec^2.

24. If the temperature of a liquid can be measured in Kelvin units as x°K or in Fahrenheit units as y°F, the relation between the two systems of measurement of temperature is given by the linear equation $y = \frac{9}{5}(x - 273) + 32$

(i) Find the temperature of the liquid in Fahrenheit if the temperature of the liquid is 313°K.
(ii) If the temperature is 158° F, then find the temperature in Kelvin.

25. The linear equation that converts Fahrenheit (F) to Celsius (C) is given by the relation

$$C = \frac{5F - 160}{9}$$

(i) If the temperature is 86°F, what is the temperature in Celsius?
(ii) If the temperature is 35°C, what is the temperature in Fahrenheit?
(iii) If the temperature is 0°C what is the temperature in Fahrenheit and if the temperature is 0°F, what is the temperature in Celsius?
(iv) What is the numerical value of the temperature which is same in both the scales?

26. Draw the graph of $x + y = 7$ and $x - y = 2$ on the same graph.

27. If the point (3, 4) lies on the graph of the equation $3y = ax + 7$, find the value of a.

28. The taxi fare in a city is as follows: For the first kilometre, the fare is Rs 8 and for the subsequent distance it is Rs 5 per km. Taking the distance covered as x km and total fare as Rs y, write a linear equation for this information, and draw its graph.

29. Solve the equation $2x + 1 = x - 3$, and represent the solution(s) on
(i) the number line,
(ii) the Cartesian plane.

30. Give the geometric representations of $y = 3$ as an equation
(i) in one variable (ii) in two variables

31. Give the geometric representations of $2x + 9 = 0$ as an equation
(i) in one variable (ii) in two variables

32. The force applied on a body is directly proportional to the acceleration produced in the body. Write an equation to express this situation and plot the graph of the equation.

33. Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

34. Draw the graphs of the equations $y = x$ and $y = -x$ in the same graph paper. Find the coordinates of the point where two lines intersect.

35. Draw the graphs of the equations $3x - 2y = 4$ and $x + y - 3 = 0$ in the same graph paper. Find the coordinates of the point where two lines intersect.

36. Draw the graphs of the equations $3x - 2y + 6 = 0$ and $x + 2y - 6 = 0$ in the same graph paper. Find the area of triangle formed by the two lines and x – axis.

37. If the number of hours for which a labourer works is x and y are his wages (in rupees) and $y = 2x - 1$, draw the graph of work – wages equation. From the graph, find the wages of the labourer if he works for 6 hours.

38. A and B are friends. A is elder to B by 5 years. B's sister C is half the age of B while A's father D is 8 years older than twice the age of B. If the present age of D is 48 years, find the present ages of A, B and C.

39. A three-wheeler scoter charges Rs. 10 for the first km and Rs. 4.50 each for every subsequent km. For a distance of x km, an amount of Rs. Y is paid. Write the linear equation representing the above information.

40. Solve: $5x + \frac{7}{2} = \frac{3}{2}x - 14$

41. Solve: $\frac{6x+1}{3} + 1 = \frac{x-3}{6}$

42. Solve: $5x - 2(2x - 7) = 2(3x - 1) + \frac{7}{2}$

43. Solve: $\frac{3x-2}{4} - \frac{2x+3}{3} = \frac{2}{3} - x$

44. Solve: $\frac{3x+2}{7} + \frac{4(x+1)}{5} = \frac{2}{3}(2x+1)$

45. Solve: $x-\frac{x-1}{2}=1-\frac{x-2}{3}$

46. Solve: $\frac{x}{2}-\frac{1}{5}=\frac{x}{3}+\frac{1}{4}$

47. Solve: $\frac{x}{2}-\frac{3x}{4}+\frac{5x}{6}=21$

48. Solve: $x+7-\frac{8x}{3}=\frac{17}{6}-\frac{5x}{2}$

49. Solve: $\frac{3x+4}{2-6x}=\frac{-2}{5}$

50. Solve: $\frac{7x+4}{x+2}=\frac{-4}{3}$

51. The ages of Rahul and Haroon are in the ratio 5:7. Four years later the sum of their ages will be 56 years. What are their present ages?

52. Baichung's father is 26 years younger than Baichung's grandfather and 29 years older than Baichung. The sum of the ages of all the three is 135 years. What is the age of each one of them?

53. Lakshmi is a cashier in a bank. She has currency notes of denominations Rs 100, Rs 50 and Rs 10, respectively. The ratio of the number of these notes is 2:3:5. The total cash with Lakshmi is Rs 4,00,000. How many notes of each denomination does she have?

54. I have a total of Rs 300 in coins of denomination Re 1, Rs 2 and Rs 5. The number of Rs 2 coins is 3 times the number of Rs 5 coins. The total number of coins is 160. How many coins of each denomination are with me?

55. The organisers of an essay competition decide that a winner in the competition gets a prize of Rs 100 and a participant who does not win gets a prize of Rs 25. The total prize money distributed is Rs 3,000. Find the number of winners, if the total number of participants is 63.

56. The digits of a two-digit number differ by 3. If the digits are interchanged, and the resulting number is added to the original number, we get 143. What can be the original number?

57. Arjun is twice as old as Shriya. Five years ago his age was three times Shriya's age. Find their present ages.

58. A positive number is 5 times another number. If 21 is added to both the numbers, then one of the new numbers becomes twice the other new number. What are the numbers?

59. Sum of the digits of a two-digit number is 9. When we interchange the digits, it is found that the resulting new number is greater than the original number by 27. What is the two-digit number?

60. One of the two digits of a two digit number is three times the other digit. If you interchange the digits of this two-digit number and add the resulting number to the original number, you get 88. What is the original number?

61. Shobo's mother's present age is six times Shobo's present age. Shobo's age five years from now will be one third of his mother's present age. What are their present ages?

62. There is a narrow rectangular plot, reserved for a school, in Mahuli village. The length and breadth of the plot are in the ratio 11:4. At the rate Rs100 per metre it will cost the village panchayat Rs 75000 to fence the plot. What are the dimensions of the plot?

63. A grandfather is ten times older than his granddaughter. He is also 54 years older than her. Find their present ages.

64. A man's age is three times his son's age. Ten years ago he was five times his son's age. Find their present ages.

65. Present ages of Anu and Raj are in the ratio 4:5. Eight years from now the ratio of their ages will be 5:6. Find their present ages.

MCQ WORKSHEET-I
CLASS IX: CHAPTER - 6
LINES AND ANGLES

1. If a ray stands on a line then the sum of the adjacent angles so formed is
(a) 100^0 (b) 180^0 c) 90^0 (d) 360^0

2. The sum of all the angles around a point is
(a) 100^0 (b) 180^0 c) 90^0 (d) 360^0

3. The sum of all the angles formed on the same side of a line at a given point on the line is
(a) 100^0 (b) 180^0 c) 90^0 (d) 360^0

4. The angle which is four times its complement is
(a) 60^0 (b) 30^0 c) 45^0 (d) 72^0

5. The angle which is five times its supplement is
(a) 150^0 (b) 180^0 c) 90^0 (d) 360^0

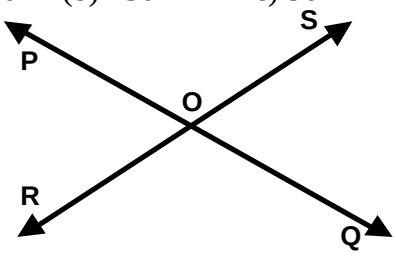
6. The measure of an angle which is equal to its complement is
(a) 60^0 (b) 30^0 c) 45^0 (d) 15^0

7. The measure of an angle which is equal to its supplement is
(a) 100^0 (b) 75^0 c) 90^0 (d) 60^0

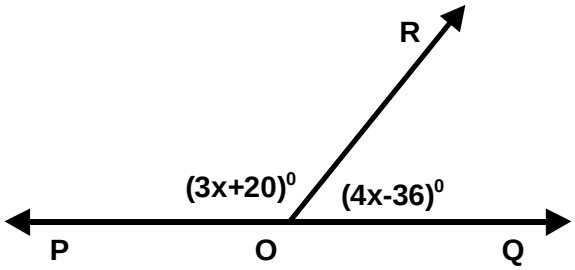
8. If two parallel lines are intersected by a transversal, then the bisectors of the two pairs of interior angles enclose
(a) a square (b) a rectangle c) a parallelogram (d) a trapezium

9. Two adjacent angles on a straight line are in the ratio 5 : 4. then the measure of each one of these angles are
(a) 100^0 and 80^0 (b) 75^0 and 105^0 c) 90^0 and 90^0 (d) 60^0 and 120^0

10. Two lines PQ and RS intersect at O. If $\angle POR = 50^0$, then value of $\angle ROQ$ is
(a) 120^0 (b) 130^0 c) 90^0 (d) 150^0



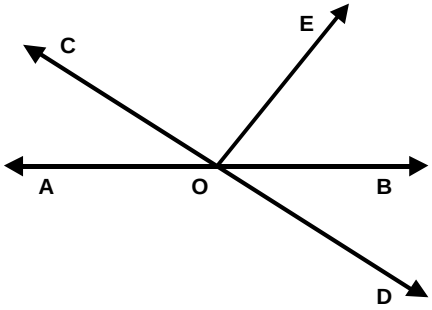
11. In the adjoining figure the value of x is
(a) 25^0 (b) 28^0 c) 30^0 (d) 60^0



12. If two straight lines intersect each other in such a way that one of the angles so formed measure 90^0, then each of the remaining angles measures is
(a) 50^0 (b) 75^0 c) 90^0 (d) 60^0

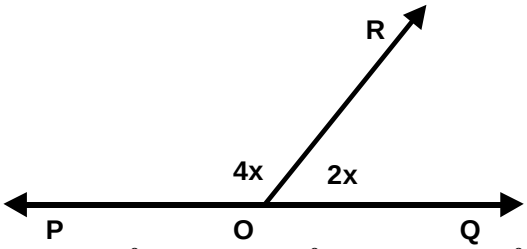
MCQ WORKSHEET-II
CLASS IX: CHAPTER - 6
LINES AND ANGLES

1. In fig. AB and CD intersect each other at O. If $\angle AOC + \angle BOE = 70^0$ and $\angle BOD = 40^0$ then the value of $\angle BOE$ is



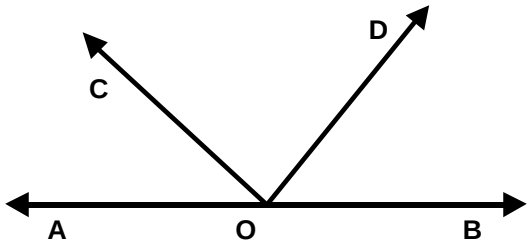
(a) 30^0 (b) 110^0 c) 120^0 (d) 150^0

2. In fig. POQ is a line, $\angle POR = 4x$ and $\angle QOR = 2x$ then the value of x is



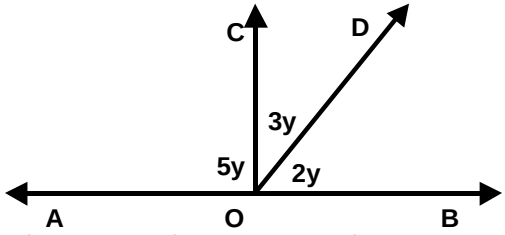
(a) 50^0 (b) 20^0 c) 30^0 (d) 90^0

3. In the given fig. $\angle AOC + \angle BOD = 75^0$, then the value of $\angle COD$ is



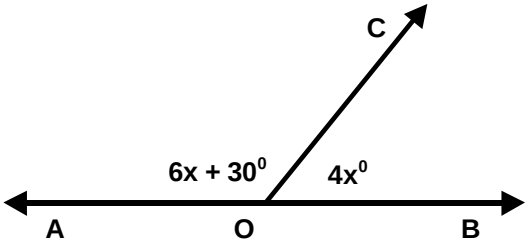
(a) 130^0 (b) 105 c) 120^0 (d) 75^0

4. In the fig. the value of y is:



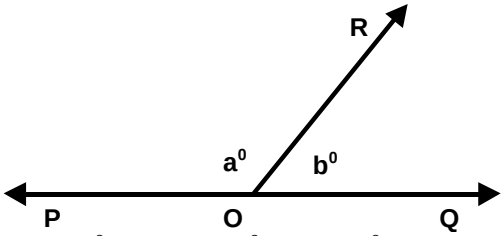
(a) 60^0 (b) 18^0 c) 30^0 (d) 90^0

5. In fig., the value of x is:



(a) 60^0 (b) 15^0 c) 30^0 (d) 45^0

6. In fig. $\angle POR$ and $\angle QOR$ form a linear pair if $a - b = 80^0$ then values of a and b respectively are:

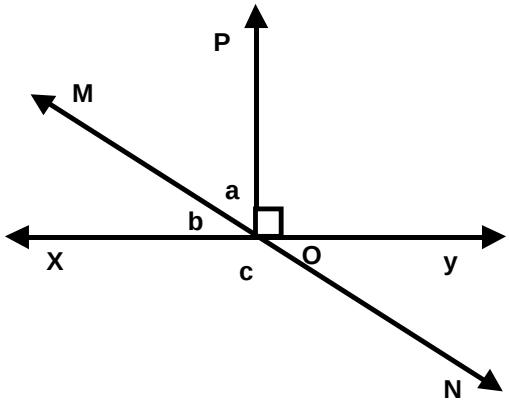


(a) 130^0 and 50^0 (b) 50^0 and 130^0 c) 60^0 and 120^0 (d) 40^0 and 140^0

7. For two parallel lines sum of interior angles on the same side of a transversal line is
(a) 100^0 (b) 180^0 c) 90^0 (d) 360^0

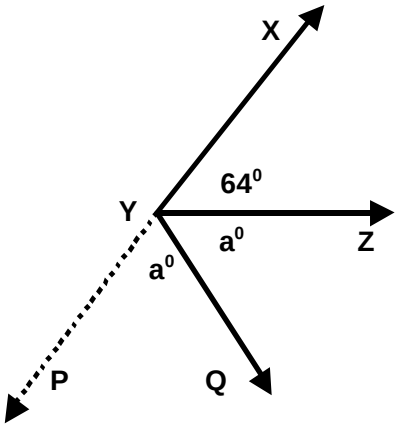
8. In fig., lines XY and MN intersect each other at point O. If $\angle POY = 90^0$ and a : b = 2 : 3 then the value of $\angle C$ is

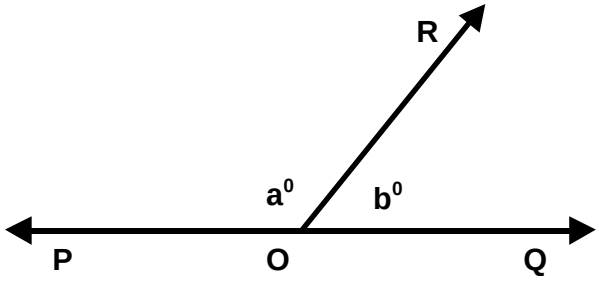
(a) 140^0 (b) 120^0 c) 80^0 (d) 95^0



9. In fig. $\angle XYZ = 640$ and XY is produced to point P. If ray YQ bisect $\angle ZYP$ then the value of $\angle XYQ$ is

(a) 122^0 (b) 126^0 c) 302^0 (d) 258^0

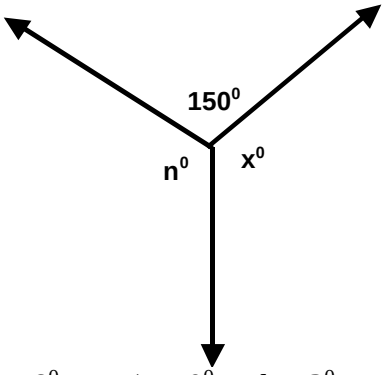




10. In fig., b is more than one-third of a right angle than a. The values of a and b are:

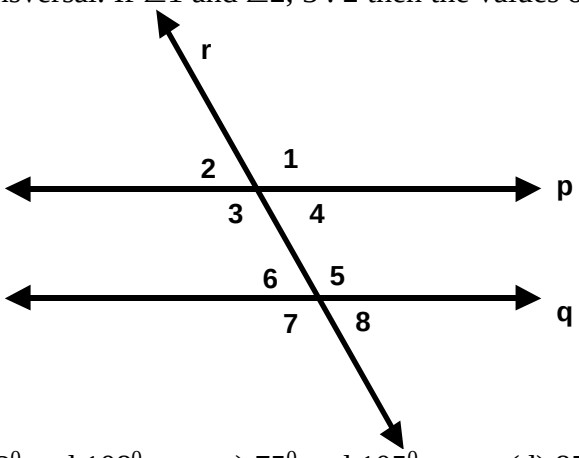
(a) 95^0 and 85^0 (b) 105^0 and 75^0 c) 60^0 and 120^0 (d) 65^0 and 115^0

11. In fig., $n - x = 3^0$ then values of x and n are:



(a) 126^0 and 129^0 (b) 125^0 and 128^0 c) 150^0 and 153^0 (d) none of these

12. In fig., q || r and p is transversal. If $\angle 1$ and $\angle 2$, 3 : 2 then the values of $\angle 3$ and $\angle 4$ are:

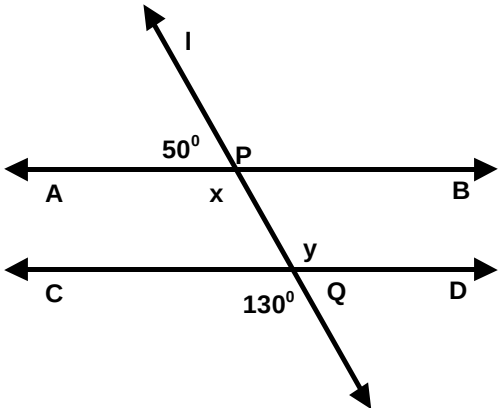


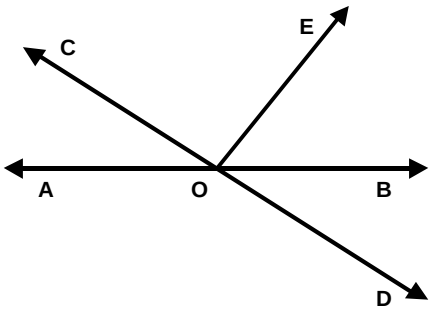
(a) 108^0 and 72^0 (b) 72^0 and 108^0 c) 75^0 and 105^0 (d) 85^0 and 95^0

MCQ WORKSHEET-III
CLASS IX: CHAPTER - 6
LINES AND ANGLES

1. In fig. the values of x and y are equal to:

(a) 130^0 (b) 150^0 c) 160^0 (d) 135^0

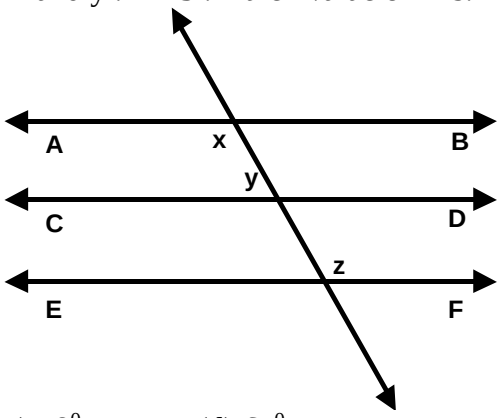




2. In fig. AB and CD intersect each other at O. If $\angle AOC + \angle BOE = 70^0$ and $\angle BOD = 40^0$ then the value of $\angle COE$ is

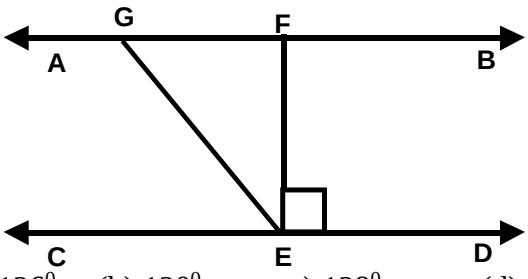
(a) 250^0 (b) 70^0 c) 30^0 (d) 50^0

3. In fig, if AB || CD, CD || EF and y : z = 3 : 7 then value of x is:



(a) 126^0 (b) 120^0 c) 58^0 (d) 62^0

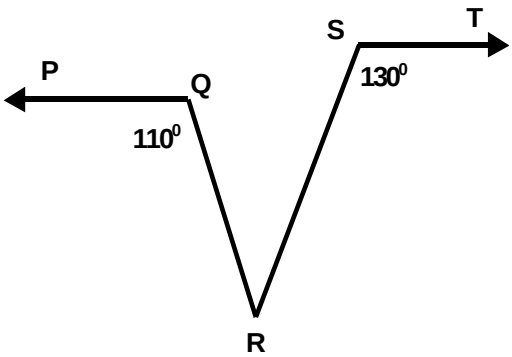
4. In fig, if AB || CD, EF ⊥ CD and $\angle GED = 126^0$ then the value of $\angle AGE$ is



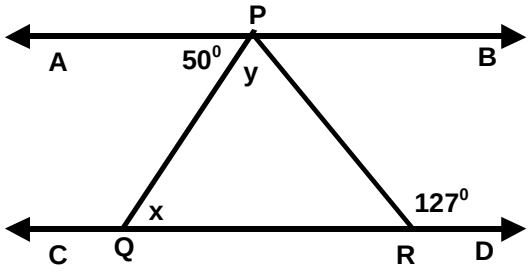
(a) 126^0 (b) 120^0 c) 128^0 (d) 54^0

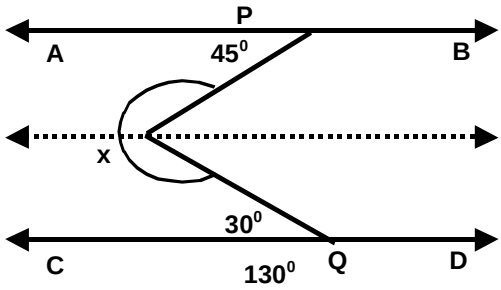
5. In fig, if PQ || ST, $\angle PQR = 110^0$ and $\angle RST = 130^0$ then the value of $\angle QRS$ is

(a) 60^0 (b) 120^0 c) 80^0 (d) 90^0



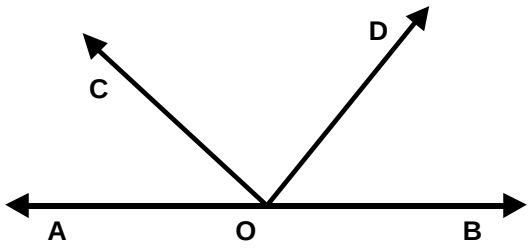
6. In fig., AB || CD, $\angle APQ = 50^0$, $\angle PRD = 127^0$, then the value of x and y respectively are
(a) 50^0 and 77^0 (b) 40^0 and 85^0 c) 60^0 and 90^0 (d) 85^0 and 75^0



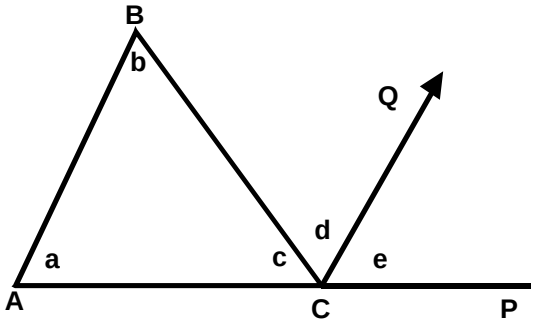


7. In fig, AB || CD, the value of x is:
(a) 185^0 (b) 280^0 c) 285^0 (d) 195^0

8. In fig, if $\angle AOC$, $\angle COD$ are equal and $\angle BOD$ is a right angle, then the values of $\angle AOC$ and $\angle COD$ are:
(a) 60^0 (b) 30^0 c) 45^0 (d) 90^0



9. In fig, the sum of $\angle a$ and $\angle b$ is:
(a) $\angle c + \angle d$ (b) $\angle d + \angle e$
(c) $\angle b + \angle c$ (d) $\angle a + \angle c$



10. In triangle interior opposite angle is always less than:
(a) any angle of the triangle (b) opposite angle
(c) right angle (d) exterior angle

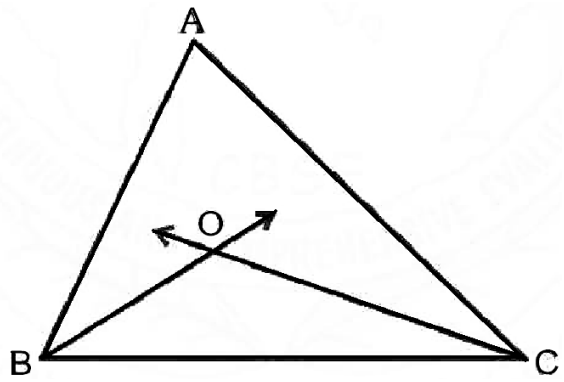
11. In a triangle sum of two interior opposite angles is always equal to:
(a) third angle (b) opposite angle
(c) right angle (d) none of these

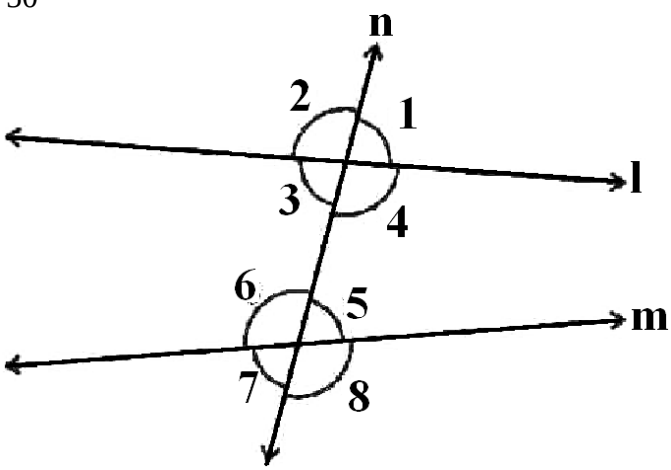
12. In a triangle exterior angle is always greater than:
(a) third angle (b) interior opposite angles
(c) right angle (d) none of these

MCQ WORKSHEET-IV
CLASS IX: CHAPTER - 6
LINES AND ANGLES

1. What is the common between the three angles of a triangle and a linear pair
(a) angles are equal (b) in both cases sum of angle is 180^0.
(c) In triangle there are three angles and in linear pair there are two angles (d) none of these.

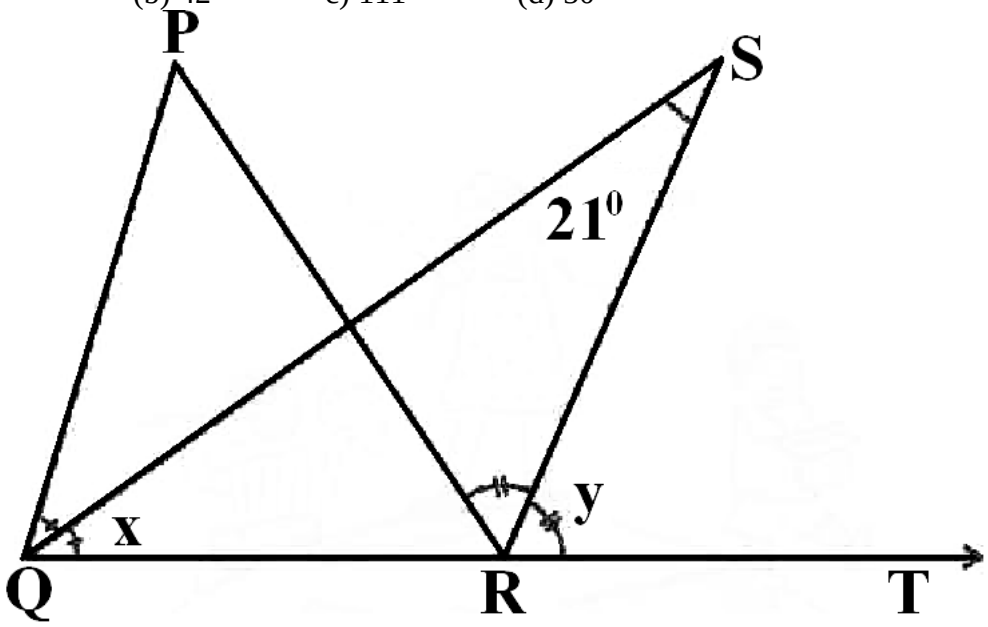
2. In the given below left figure, the bisectors of $\angle ABC$ and $\angle BCA$, intersect each other at point O. If $\angle BOC = 100^0$, the $\angle A$ is
(a) 30^0 (b) 20^0 c) 40^0 (d) 50^0





3. In the given above right sided figure, $\angle 2$ and $\angle 8$ are known as
(a) exterior angles (b) exterior angles on the same side of transversal.
(c) alternate angles (d) alternate exterior angles.

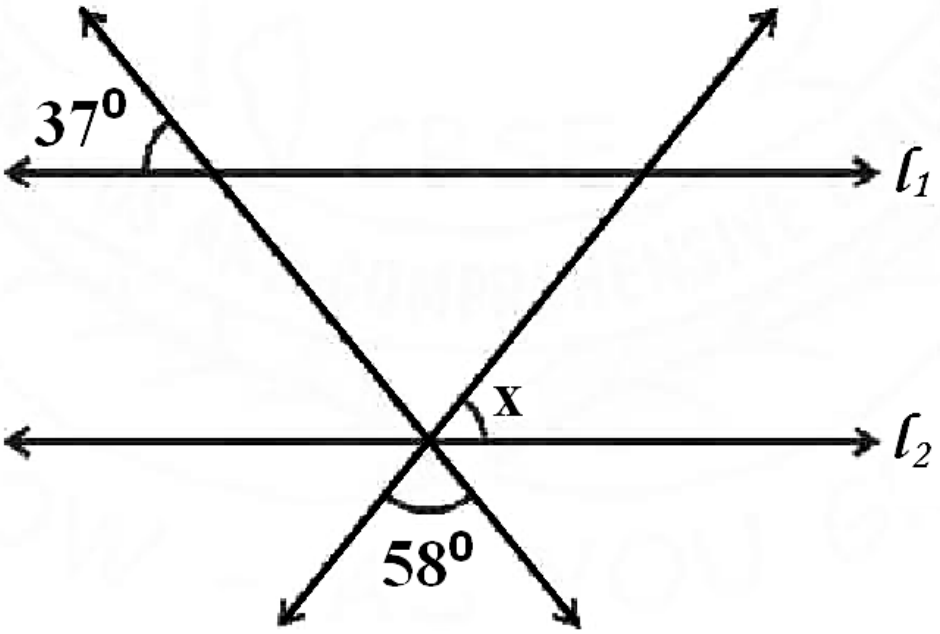
4. In the given figure, measure of $\angle QPR$ is
(a) 10.5^0 (b) 42^0 c) 111^0 (d) 50^0



5. An angle is 200 more than three times the given angle. If the two angles are supplementary the angles are
(a) 20^0 and 160^0 (b) 40^0 and 140^0 c) 60^0 and 120^0 (d) 70^0 and 110^0

6. In figure, if $l_1 \parallel l_2$, what is the value of x

(a) 90^0 (b) 85^0 c) 75^0 (d) 70^0



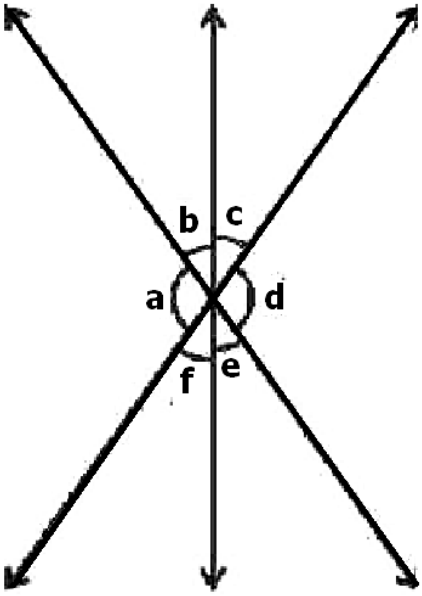
7. If a wheel has six spokes equally spaced, then the measure of the angle between two adjacent spokes is

(a) 90^0 (b) 30^0 c) 60^0 (d) 180^0

8. In figure, which of the following statements must be true?

(i) a + b = d + c (ii) $a + c + e = 180^0$ (iii) b + f = c + e

(a) (i) only (b) (ii) only c) (iii) only (d) (ii) and (iii) both



9. The angle which is two times its complement is

(a) 60^0 (b) 30^0 c) 45^0 (d) 72^0

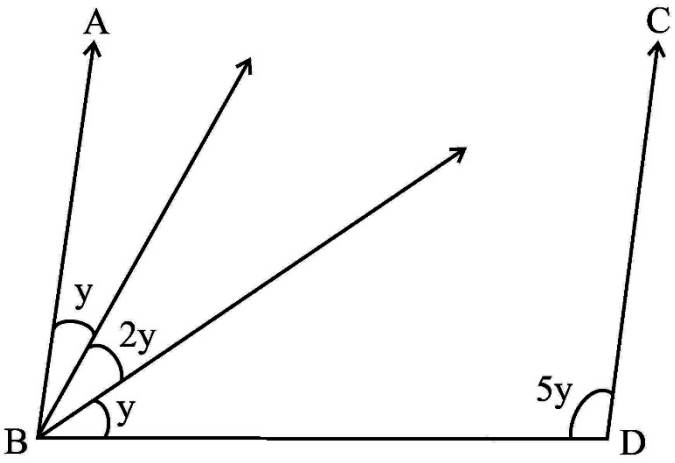
10. The angle which is two times its supplement is

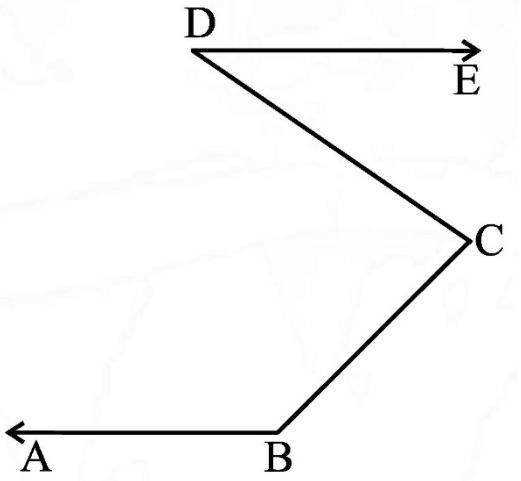
(a) 150^0 (b) 60^0 c) 90^0 (d) 120^0

PRACTICE QUESTIONS

CLASS IX: CHAPTER - 6
LINES AND ANGLES

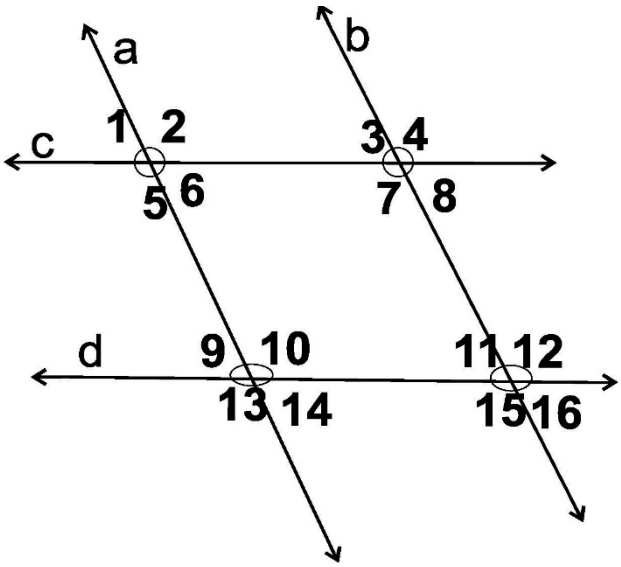
1. In the figure, if AB || CD, then what is the value of y.



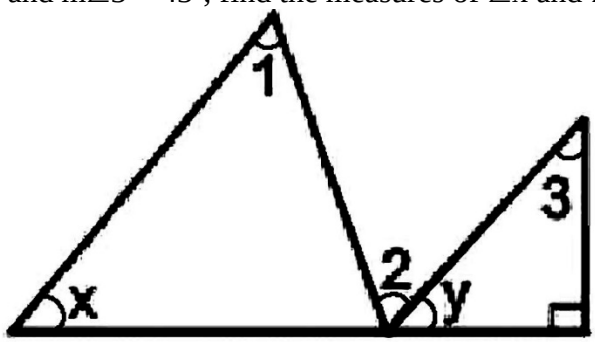


2. In the given above right sided figure, BA || DE. Prove that $\angle ABC + \angle BCD = 180^0 + \angle CDE$

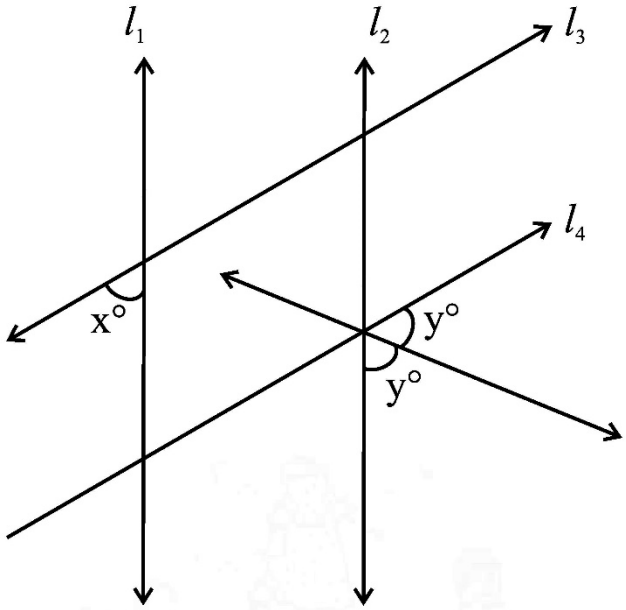
3. In the given figure a || b and c || d.
(i) Name all the angles equal to $\angle 5$. Justify the your answer
(ii) Name all angles supplementary to $\angle 8$. Justify the your answer
(iii) If $\angle 4 = 110^0$, then find all other angles. What all properties of parallel lines you have used here?



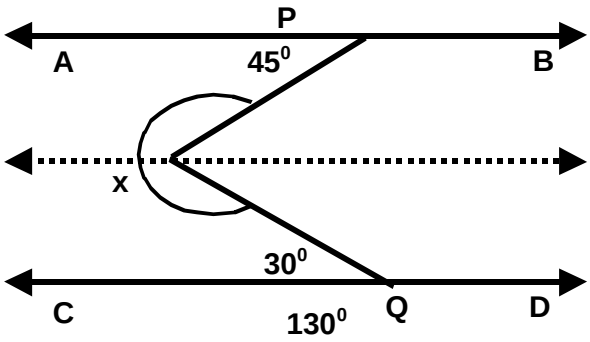
4. If $m\angle 1=53^0$, $m\angle 2 = 65^0$ and $m\angle 3 = 43^0$, find the measures of $\angle x$ and $\angle y$. Justify your answer.



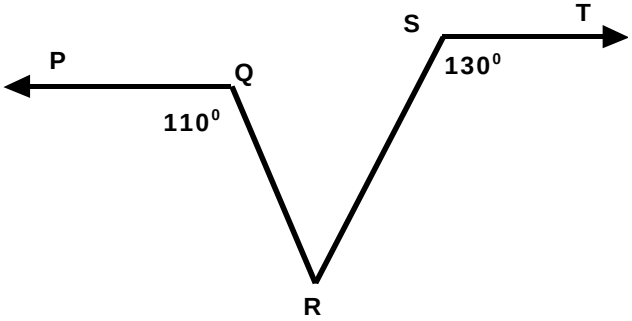
5. In figure, if $l_1 \parallel l_2$ and $l_3 \parallel l_4$. What is y in terms of x?



6. In fig, find the value of x



7. In fig, if PQ || ST, $\angle PQR = 110^0$ and $\angle RST = 130^0$ then find the value of $\angle QRS$.



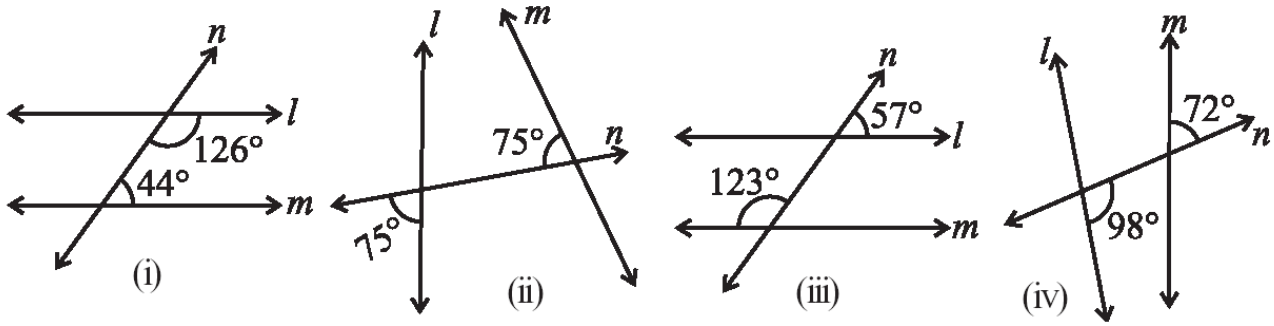
8. An angle is greater than 45º. Is its complementary angle greater than 45º or equal to 45º or less than 45º?

9. Prove that "The sum of all interior angles of a triangle is 180^0".

10. One of the angles of a triangle is 80º and the other two angles are equal. Find the measure of each of the equal angles.

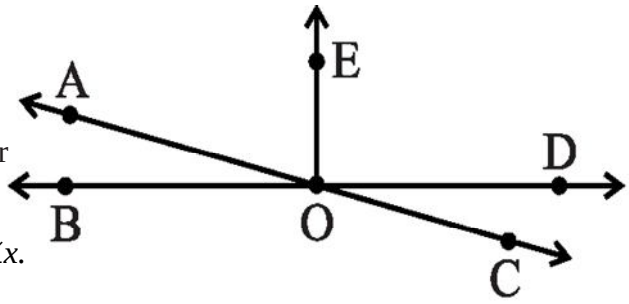
11. The three angles of a triangle are in the ratio 1:2:1. Find all the angles of the triangle.

12. In the given figures below, decide whether l is parallel to m.

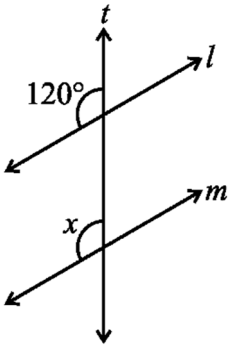


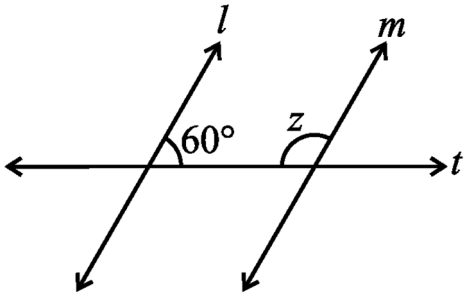
13. In the adjoining figure, name the following pairs of angles.

(i) Obtuse vertically opposite angles
(ii) Adjacent complementary angles
(iii) Equal supplementary angles
(iv) Unequal supplementary angles
(v) Adjacent angles that do not form a linear pair



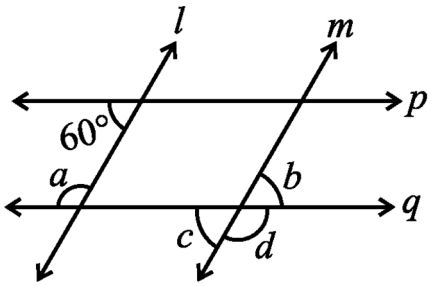
14. Lines $l \parallel m$; t is a transversal Find the value of $\angle x$.

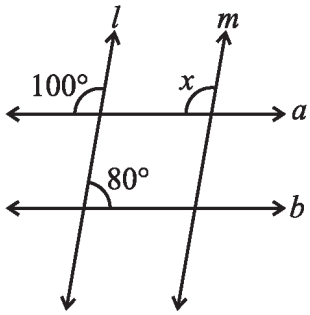




15. Lines $l \parallel m$; t is a transversal in the above right sided figure. Find the value of $\angle z$

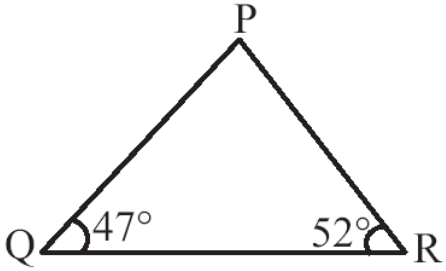
16. Lines $l \parallel m$, $p \parallel q$; Find a, b, c, d



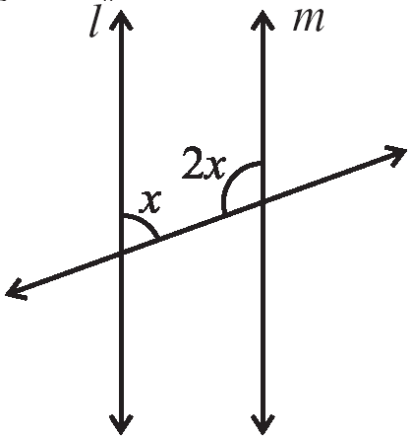


17. Find the value of x in the above right sided figure if $l \parallel m$.

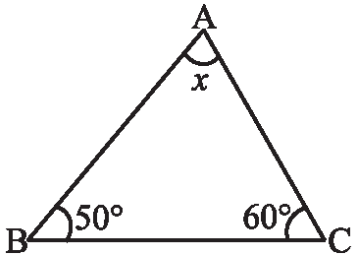
18. In the given figure, find m$\angle$P.

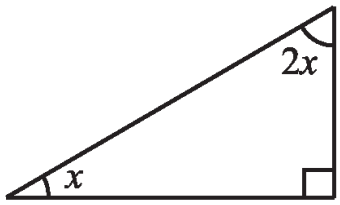


19. Find the value of x in below figure if $l \parallel m$.



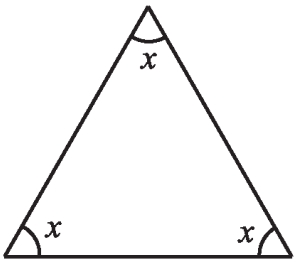
20. Find the value of the unknown x in the below figure.

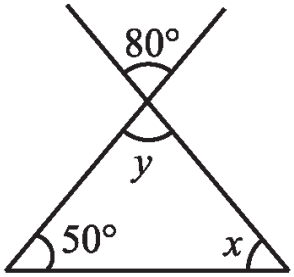




21. Find the value of the unknown x in the above right sided figure.

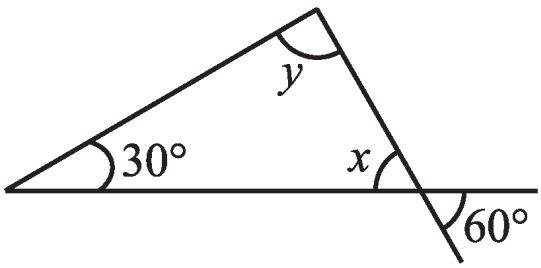
22. Find the value of the unknown x in the below figure.

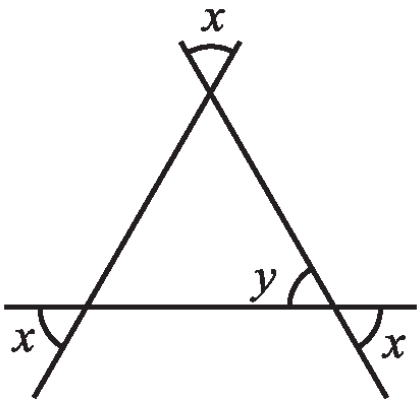




23. Find the value of x and y in the above right sided figure.

24. Find the value of x and y in the below figure.

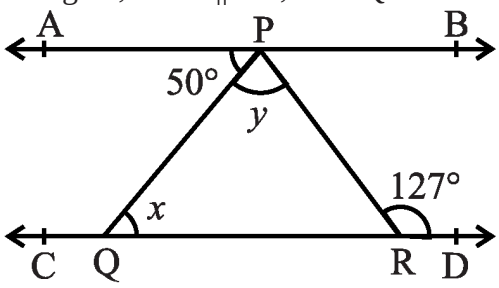




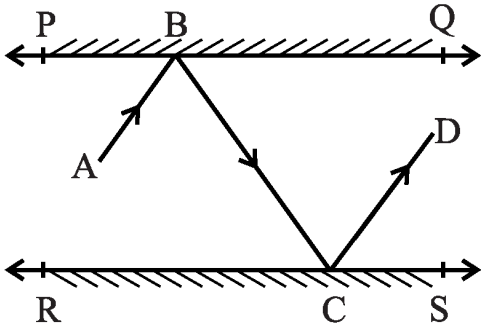
25. Find the value of x and y in the above right sided figure.

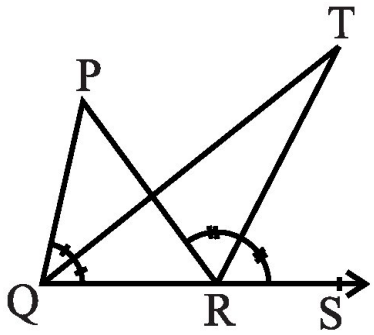
26. An exterior angle of a triangle is 105° and its two interior opposite angles are equal. Find the angles

27. In the below figure, if AB || CD, ∠APQ = 50° and ∠PRD = 127°, find x and y.



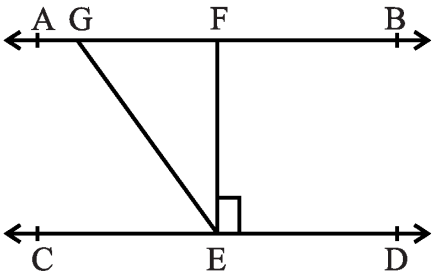
28. In the adjoining figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB || CD.

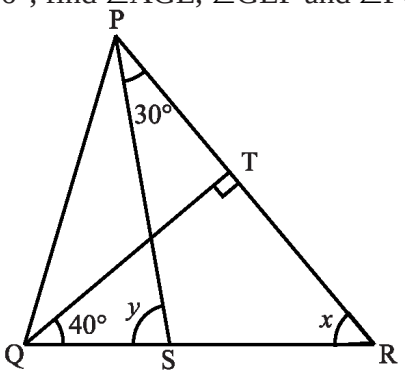




29. In the above right sided figure, the side QR of . PQR is produced to a point S. If the bisectors of ∠PQR and ∠PRS meet at point T, then prove that ∠QTR = $\frac{1}{2}$ ∠QPR.

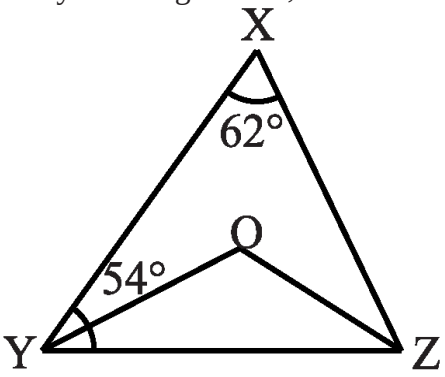
30. In below figure, if AB || CD, EF ⊥ CD and ∠GED = 126°, find ∠AGE, ∠GEF and ∠FGE.

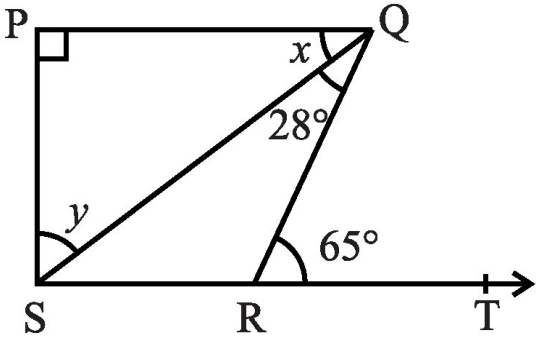




31. In the above right sided figure, if QT ⊥ PR, ∠TQR = 40° and ∠SPR = 30°, find x and y.

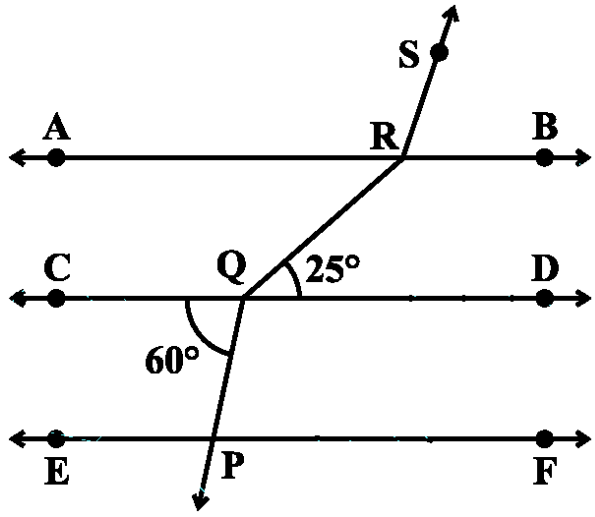
32. In below figure, ∠X = 62°, ∠XYZ = 54°. If YO and ZO are the bisectors of ∠XYZ and ∠XZY respectively of triangle XYZ, find ∠OZY and ∠YOZ.

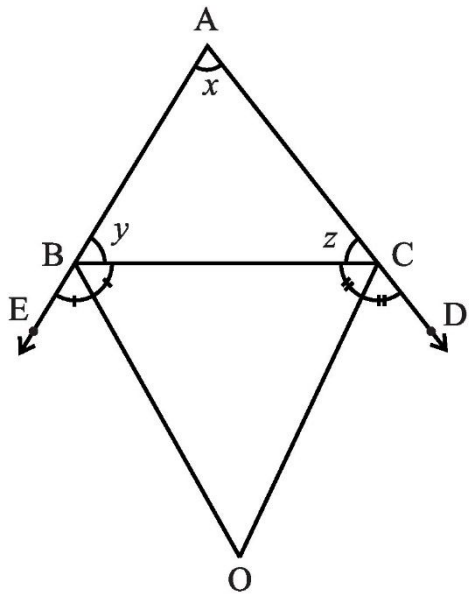




33. In the above right sided figure, if PQ ⊥ PS, PQ || SR, ∠ SQR = 28° and ∠QRT = 65°, then find the values of x and y.

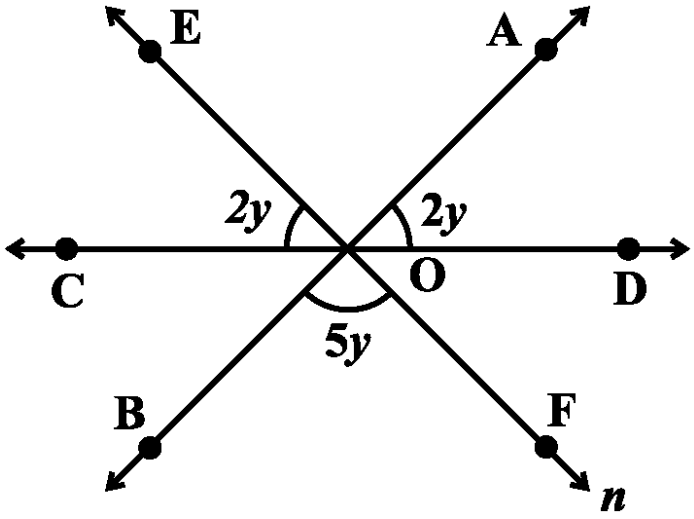
34. In the below Figure, if AB || CD || EF, PQ || RS, ∠RQD = 25° and ∠CQP = 60°, then find ∠QRS and ∠RQP

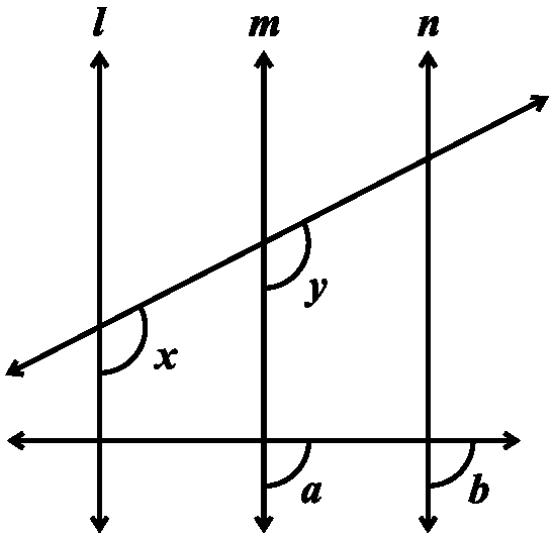




35. In the above right sided figure, the sides AB and AC of a triangle ABC are produced to points E and D respectively. If bisectors BO and CO of ∠CBE and ∠BCD respectively meet at point O, then prove that ∠BOC = $90^0 - \frac{1}{2}$∠BAC.

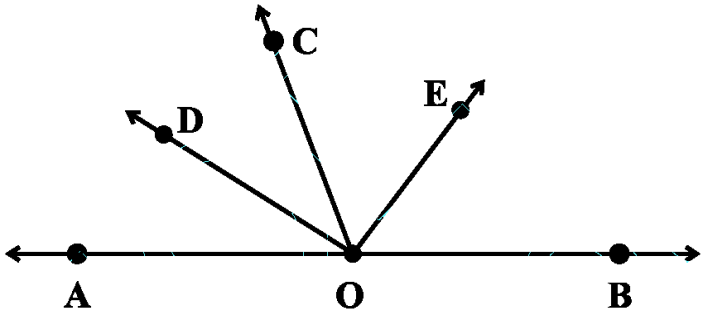
36. In the below Figure, AB, CD and EF are three lines concurrent at O. Find the value of *y*.



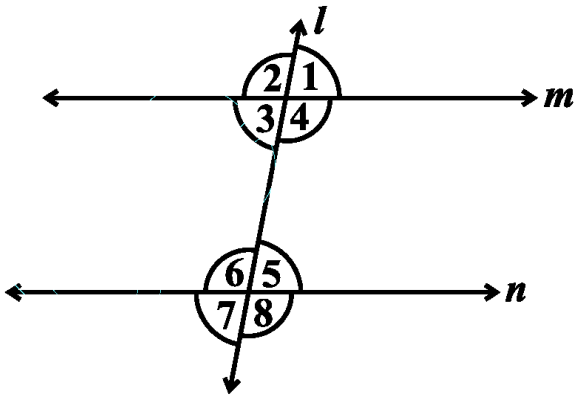


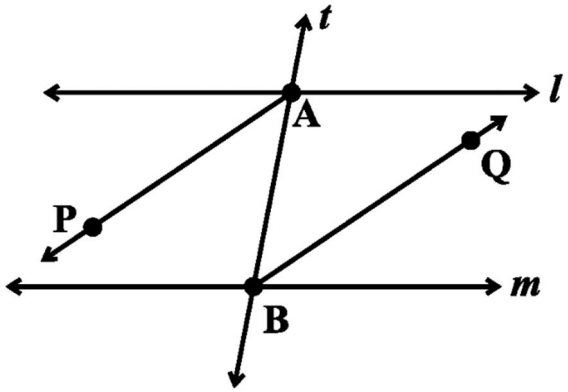
37. In the above right sided Figure, *x* = *y* and *a* = *b*. Prove that *l* || *n*.

38. In the below Figure, OD is the bisector of ∠AOC, OE is the bisector of ∠BOC and OD ⊥ OE. Show that the points A, O and B are collinear.



39. In the below Figure, $\angle 1 = 60°$ and $\angle 6 = 120°$. Show that the lines m and n are parallel.

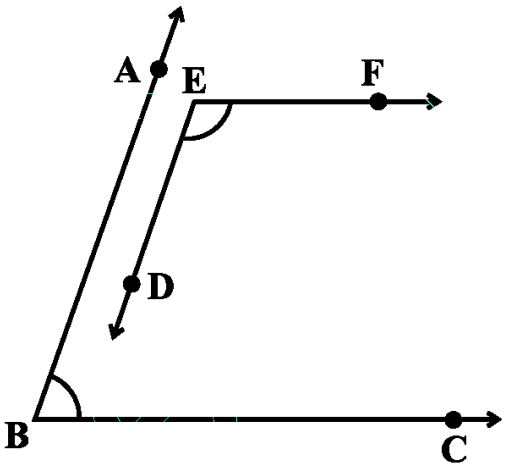


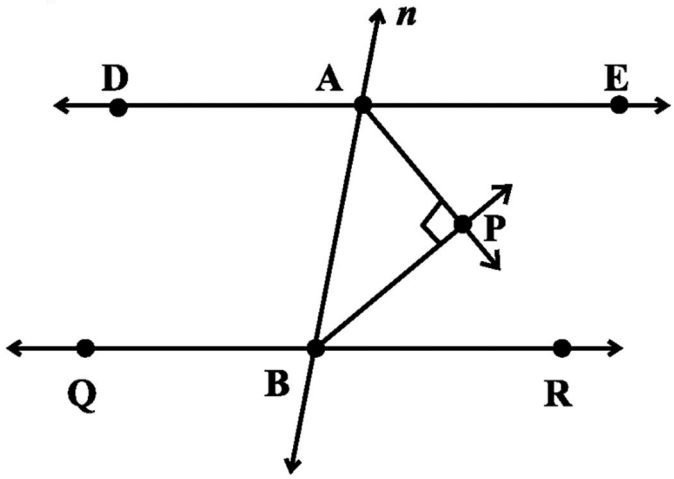


40. AP and BQ are the bisectors of the two alternate interior angles formed by the intersection of a transversal t with parallel lines l and m (see above right sided Figure). Show that AP || BQ.

41. If in the above right sided Figure for Q40, bisectors AP and BQ of the alternate interior angles are parallel, then show that l || m.

42. In the below Figure, BA || ED and BC || EF. Show that $\angle ABC = \angle DEF$





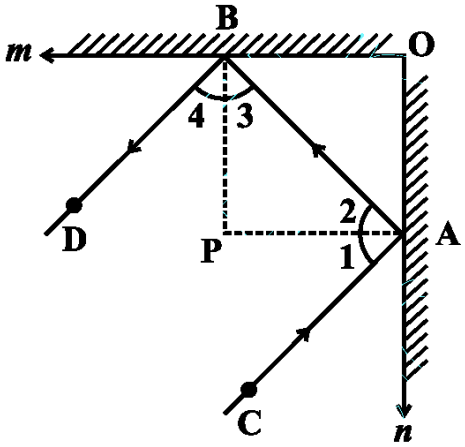
43. In the above right sided Figure, DE || QR and AP and BP are bisectors of $\angle EAB$ and $\angle RBA$, respectively. Find $\angle APB$.

44. The angles of a triangle are in the ratio 2 : 3 : 4. Find the angles of the triangle.

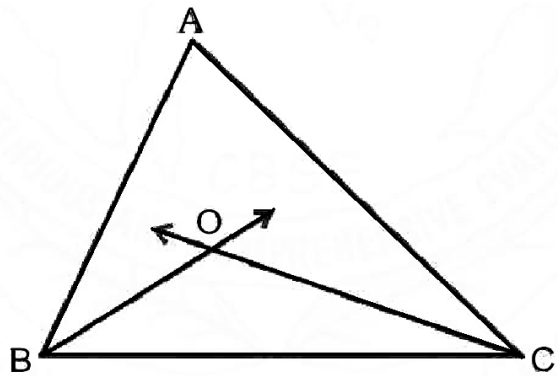
45. A triangle ABC is right angled at A. L is a point on BC such that AL $\perp$ BC. Prove that $\angle BAL = \angle ACB$.

46. Two lines are respectively perpendicular to two parallel lines. Show that they are parallel to each other.

47. In the below Figure, m and n are two plane mirrors perpendicular to each other. Show that incident ray CA is parallel to reflected ray BD.



48. Bisectors of angles B and C of a triangle ABC intersect each other at the point O(see above right sided figure). Prove that $\angle BOC = 90° + \frac{1}{2}\angle A$.



49. Bisectors of interior $\angle B$ and exterior $\angle ACD$ of a ΔABC intersect at the point T. Prove that $\angle BTC = \frac{1}{2}\angle BAC$.

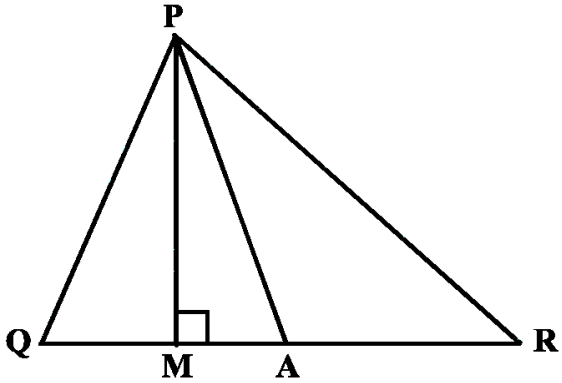
50. A transversal intersects two parallel lines. Prove that the bisectors of any pair of corresponding angles so formed are parallel.

51. Prove that through a given point, we can draw only one perpendicular to a given line.

52. Prove that two lines that are respectively perpendicular to two intersecting lines intersect each other.

53. Prove that a triangle must have at least two acute angles.

54. In the below Figure, $\angle Q > \angle R$, PA is the bisector of $\angle QPR$ and $PM \perp QR$. Prove that $\angle APM = \frac{1}{2}(\angle Q - \angle R)$.



55. If one of the angles of a triangle is 130°, then find the angle between the bisectors of the other two angles .

56. The angles of a triangle are in the ratio 5 : 3 : 7. Find the largest angle of the triangle.

57. Two adjacent angles are equal. Is it necessary that each of these angles will be a right angle? Justify your answer.

58. If one of the angles formed by two intersecting lines is a right angle, what can you say about the other three angles? Give reason for your answer.

59. Two lines *l* and *m* are perpendicular to the same line *n*. Are *l* and *m* perpendicular to each other? Give reason for your answer.

60. Angles of a triangle are in the ratio 2 : 4 : 3. find the smallest angle of the triangle.

MCQ WORKSHEET-I
CLASS IX: CHAPTER - 7
TRIANGLES

1. Line segment joining the mid point of any side with the opposite vertex is
(a) altitude (b) median c) perpendicular bisector (d) angle bisector

2. The length of perpendicular drawn from the opposite vertex to any side is
(a) altitude (b) median c) perpendicular bisector (d) angle bisector

3. The point of intersection of all the altitudes of a triangle is
(a) orthocentre (b) incentre c) circumcentre (d) centroid

4. The point of intersection of the perpendicular bisector of all sides of a triangle is
(a) orthocentre (b) incentre c) circumcentre (d) centroid

5. In a triangle, the angle opposite to the longest side is:
(a) greater than 60^0 (b) measure of 50^0
(c) greater than 90^0 (d) none of these

6. The point of intersection of all the medians of a triangle is
(a) orthocentre (b) incentre c) circumcentre (d) centroid

7. In a triangle ABC, if $2\angle A = 3\angle B = 6\angle C$, then the measure of $\angle A$ is
(a) 30^0 (b) 75^0 c) 90^0 (d) 60^0

8. In a triangle ABC, if $2\angle A = 3\angle B = 6\angle C$, then the measure of $\angle B$ is
(a) 30^0 (b) 75^0 c) 90^0 (d) 60^0

9. In a triangle ABC, if $2\angle A = 3\angle B = 6\angle C$, then the measure of $\angle C$ is
(a) 30^0 (b) 75^0 c) 90^0 (d) 60^0

10. In a triangle ABC, if $\angle A - \angle B = 33^0$ and $\angle B - \angle C = 18^0$, then the measure of $\angle A$ is
(a) 88^0 (b) 55^0 c) 37^0 (d) 60^0

11. In a triangle ABC, if $\angle A - \angle B = 33^0$ and $\angle B - \angle C = 18^0$, then the measure of $\angle B$ is
(a) 88^0 (b) 55^0 c) 37^0 (d) 60^0

12. In a triangle ABC, if $\angle A - \angle B = 33^0$ and $\angle B - \angle C = 18^0$, then the measure of $\angle C$ is
(a) 88^0 (b) 55^0 c) 37^0 (d) 60^0

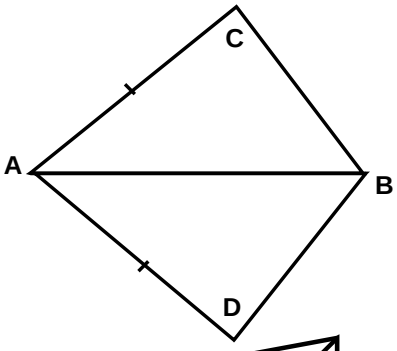
13. In a triangle ABC, if $\angle A + \angle B = 65^0$ and $\angle B + \angle C = 140^0$, then the measure of $\angle A$ is
(a) 40^0 (b) 25^0 c) 115^0 (d) 60^0

14. In a triangle ABC, if $\angle A + \angle B = 65^0$ and $\angle B + \angle C = 140^0$, then the measure of $\angle B$ is
(a) 40^0 (b) 25^0 c) 115^0 (d) 60^0

15. In a triangle ABC, if $\angle A + \angle B = 65^0$ and $\angle B + \angle C = 140^0$, then the measure of $\angle C$ is
(a) 40^0 (b) 25^0 c) 115^0 (d) 60^0

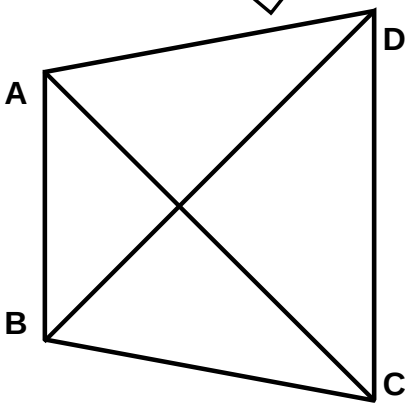
MCQ WORKSHEET-II
CLASS IX: CHAPTER - 7
TRIANGLES

1. In quadrilateral ABCD, AC = AD and AB bisect ∠A and ΔABC ≅ ΔABD. The relation between BC and BD is



(a) BC > BD (b) BC < BD
(c) BC = BD (d) BC = (1/2)BD

2. In quadrilateral ABCD, AD = BC and ∠DAB = ∠CBA. If ΔABD ≅ ΔBAC. The relation between ∠ABD and ∠BAC is



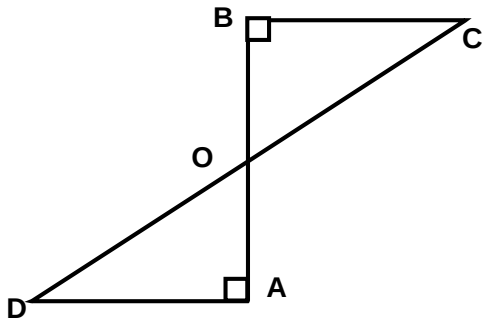
(a) ∠ABD > ∠BAC (b) ∠ABD < ∠BAC
(c) ∠ABD = ∠BAC (d) ∠ABD = (1/2)∠BAC

3. ΔABC is right triangle in which $\angle A = 90^0$ and AB = AC. The values of ∠B and ∠D will be
(a) $\angle B = \angle C = 60^0$ (b) $\angle B = \angle C = 30^0$
(c) $\angle B = \angle C = 45^0$ (d) $\angle B = \angle C = 50^0$

5. The measure of each angle of an equilateral triangle is:
(a) 60^0 (b) 30^0 c) 45^0 (d) 40^0

6. If the vertical angle of a isosceles triangle is 400 then measure of other two angles will be
(a) $60^0, 60^0$ (b) $70^0, 70^0$
(c) $50^0, 50^0$ (d) $75^0, 75^0$

7. If ∠A, ∠B and ∠C of ΔABC are equal then triangle is:
(a) Equilateral (b) Isosceles
(c) Scalene (d) none of these.

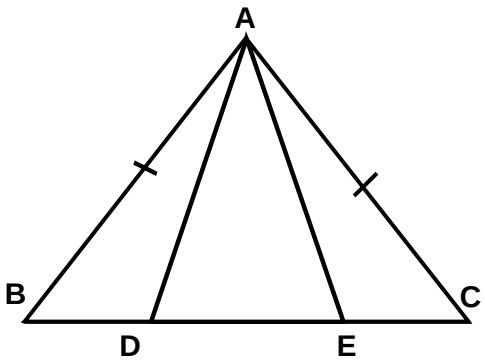


8. AC and BD are equal perpendicular to line segment AB. If ΔBOC ≅ ΔAOD, then the relation between OC and OD is
(a) OD > OC (b) OD < OC
(c) OD = OC (d) OD = (1/2)OC

9. If M is the midpoint of hypotenuse Ac of right triangle ABC then BM = $\frac{1}{2}$ ____

(a) AC (b) BC (c) AB (d) none of these

10. In fig. AB = AC and BF = CD. If ΔACD ≅ ΔABE then AD =



(a) AC (b) AE (c) AB
(d) none of these

MCQ WORKSHEET-III
CLASS IX: CHAPTER - 7
TRIANGLES

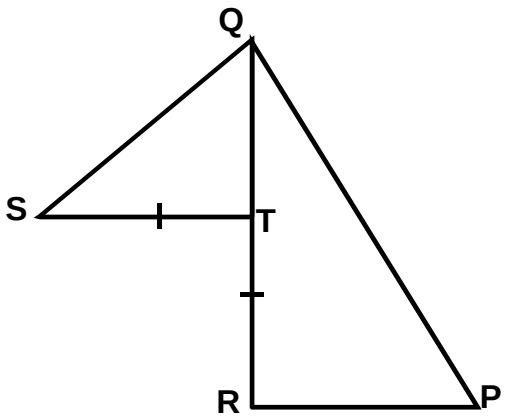
1. In a triangle, the angle opposite to the longer side is:
(a) larger (b) 90^0 (c) smaller (d) none of these

2. In a triangle side opposite to larger angle is
(a) longer (b) shorter (c) equal (d) none of these

3. In a triangle, the sum of its two sides is _____ third side.
(a) equal to (b) less than (c) greater than (d) none of these

4. The point of intersection of the angle bisector of all internal angles of a triangle is
(a) orthocentre (b) incentre c) circumcentre (d) centroid

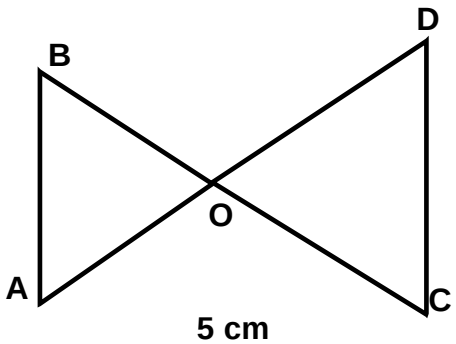
5. In fig, PQR is a triangle in which T is a point on QR and if S is a point such that RT = ST: then PQ + PR ___ QS
(a) PQ + PR > QS (b) PQ + PR < QS
(c) PQ + PR = QS (d) PQ + PR = $\frac{1}{2}$ QS



6. The sum of three altitudes of triangle is _____ the sum of its three sides.
(a) equal to (b) less than
(c) greater than (d) none of these

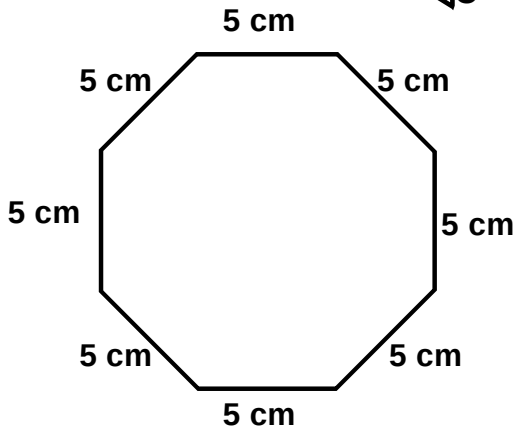
7. In a right angled triangle, _____ is the longest side.
(a) perpendicular (b) hypotenuse (c) base (d) none of these

8. In fig, $\angle B < \angle A$ and $\angle C < \angle D$ then relation between AD and BC is
(a) AD > BC (b) AD < BC
(c) AD = BC (d) none of these

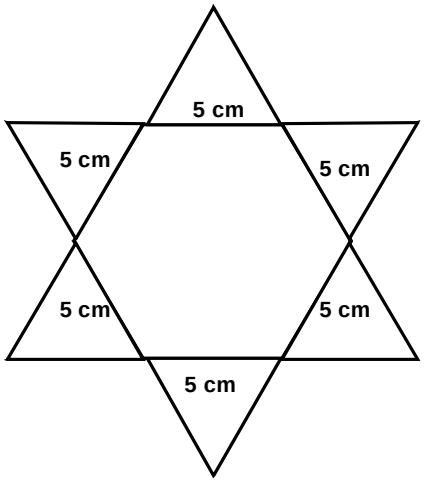


9. In a triangle ABC, $\angle A = \angle B = 62\frac{1}{2}^0$ then the longest side is
(a) AC (b) BC (c) AB (d) none of these

10. How many equilateral triangles each of 1 cm and fill the given hexagonal rangoli?
(a) 200 (b) 300 (c) 150 (d) 250



MCQ WORKSHEET-IV
CLASS IX: CHAPTER - 7
TRIANGLES



1. How many equilateral triangles each of 1 cm and fill the given star rangoli?
(a) 200 (b) 300 (c) 150 (d) 350

2. In a triangle ABC, AC > AB and bisector of ∠A meets BC at D then ∠ADB is:
(a) acute angle (b) right angle
(c) obtuse angle (d) linear angle

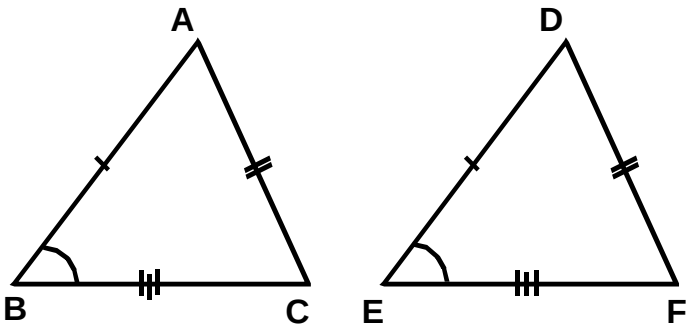
3. The difference between any two sides of a triangle is _____ the third side.
(a) equal to (b) less than (c) greater than (d) half

4. If two angles of a triangle are unequal then the side opposite side to the smaller angle is:
(a) greater (b) 90^0 (c) smaller (d) none of these

5. The sides opposite to two equal angles of a triangle are:
(a) not equal (b) congruent (c) may be congruent (d) not congruent

6. Which one of the following is the value of congruency?
(a) SAS (b) ASS (c) SSA (d) none of these

7. By which congruence rule following triangles are congruent ?
(a) SAS (b) ASS (c) AAS (d) SSS



8. In a right triangle, if acute angle is double of other angle then hypotenuse is:
(a) equal to the smallest side (b) three times the smallest side
(c) twice the smallest side (d) smaller than any of the two sides

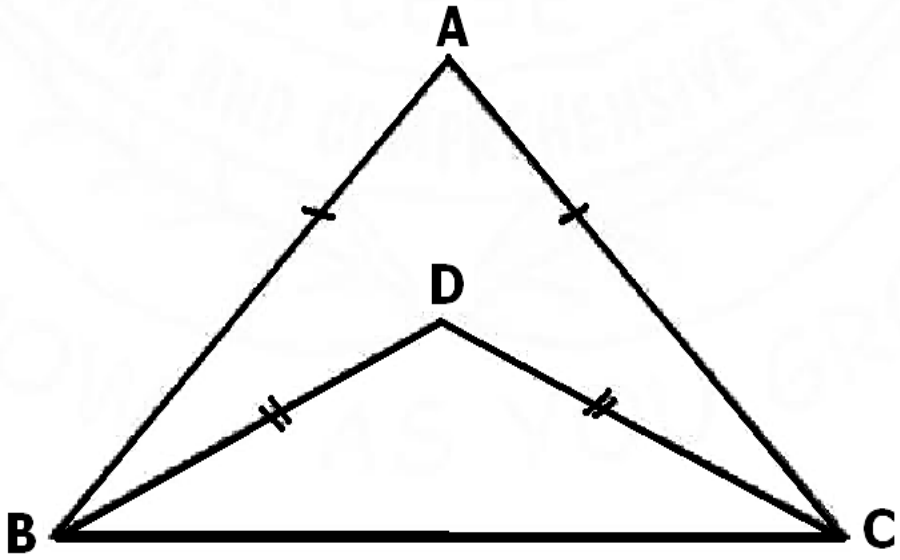
9. In a triangle ABC, if median BE = median CF then triangle is:
(a) Equilateral (b) Isosceles (c) Scalene (d) none of these.

10. The perimeter of a triangle is _____ the sum of its medians.
(a) equal to (b) less than (c) greater than (d) half of

MCQ WORKSHEET-V
CLASS IX: CHAPTER - 7
TRIANGLES

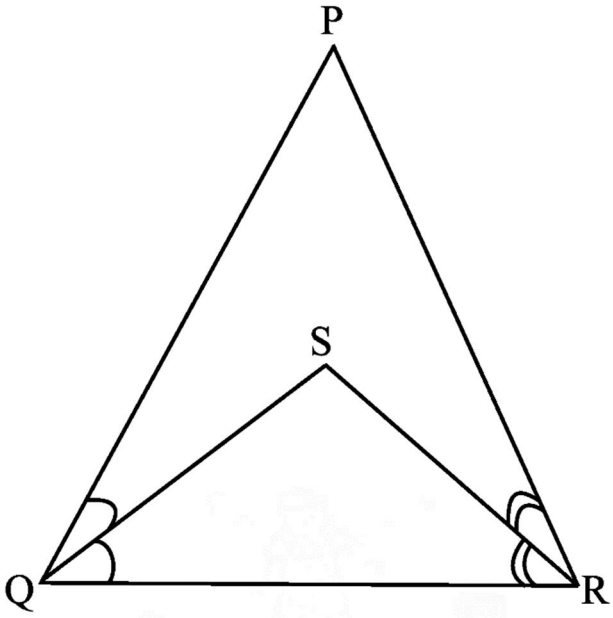
1. If one angle of a triangle is equal to the sum of other two angles, then the triangle is
(a) an Equilateral triangle (b) an Isosceles triangle
(c) an obtuse triangle (d) a right triangle .

2. In the given figure, the ratio ∠ABD : ∠ACD is
(a) 1 : 1 (b) 2 : 1 (c) 1 : 2 (d) 2 : 3



3. ∠x and ∠y are exterior angles of a ΔABC, at the points B and C respectively. Also ∠B > ∠C, then relation between ∠x and ∠y is
(a) ∠x > ∠y (b) ∠x < ∠y (c) ∠x = ∠y (d) none of these

4. In the given figure, PQ > PR, QS and RS are the bisectors of ∠Q and ∠R respectively, then
(a) SQ > SR (b) SQ < SR (c) SQ = SR (d) none of these

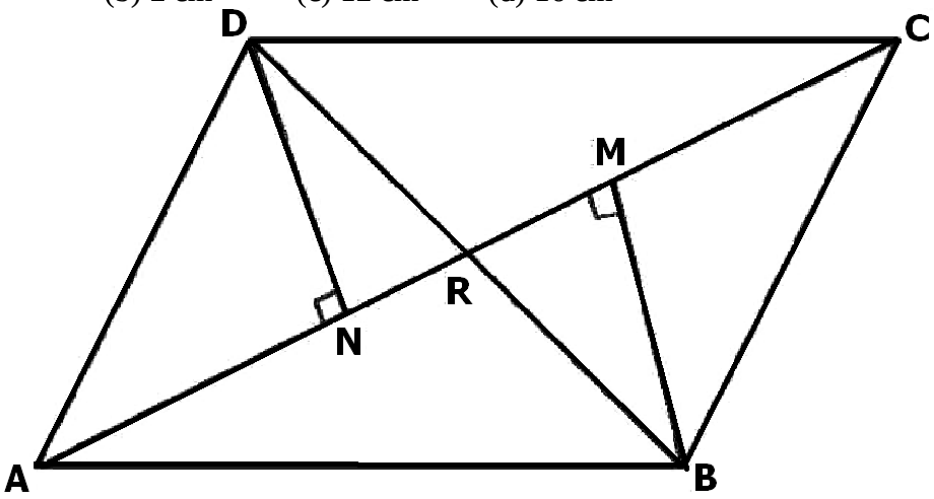


5. If the bisector of vertical angle of a triangle is perpendicular to the base of triangle is
(a) an Equilateral triangle (b) a scalene triangle
(c) an obtuse angled triangle (d) an acute angled triangle .

6. In a ΔABC and ΔPQR, three equality relations between same parts are as follows:
AB = QP, ∠B = ∠P and BC = PR
State which of the congruence conditions applies:
(a) SAS (b) ASA (c) SSS (d) RHS

7. D, E , F are the midpoints of the sides BC, CA and AB respectively of ΔABC, then ΔDEF is congruent to triangle
(a) ABC (b) AEF
(c) BFD, CDE (d) AFE, BFD, CDE

8. In quadrilateral ABCD, BM and DN are drawn perpendicular to AC such that BM = DN. If BR = 8 cm, then BD is
(a) 4 cm (b) 2 cm (c) 12 cm (d) 16 cm

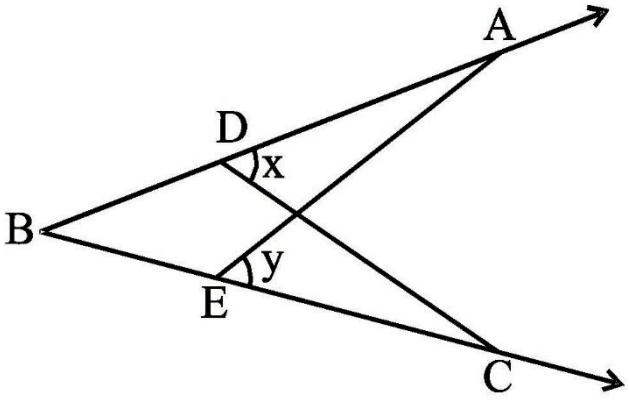


9. If ΔABC ≅ ΔPQR and ΔABC is not congruent to ΔRPQ, then which of the following is not true:
(a) BC = PQ (b) AC = PR (c) QR = BC (d) AB = PQ

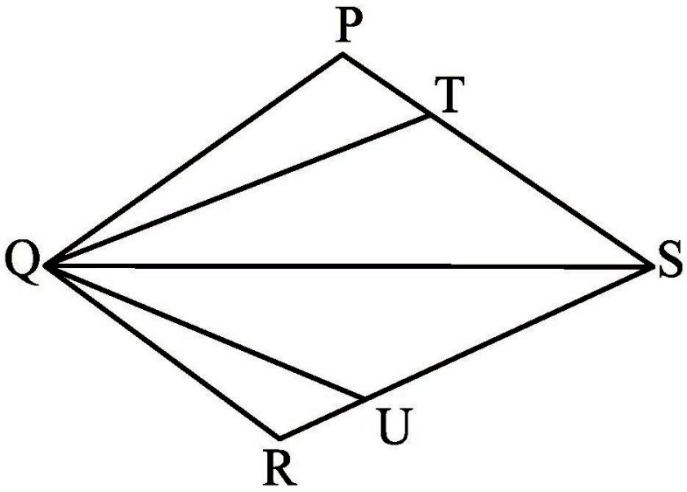
10. D is a point on the side BC of a ∠ABC such that AD bisects ΔBAC. Then
(a) BD = CD (b) BA > BD (c) BD > BA (d) CD > CA

PRACTICE QUESTIONS
CLASS IX: CHAPTER - 7
TRIANGLES

1. In the figure if $\angle x = \angle y$ and AB = CB. Prove that AE = CD.

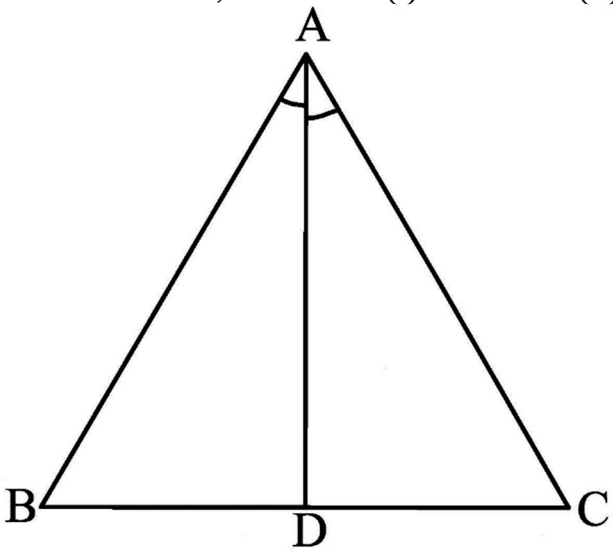


2. In the figure PQRS is a quadrilateral and T and U are respectively points on PS and RS such that PQ = RQ, $\angle PQT = \angle RQU$ and $\angle TQS = \angle UQS$. Prove that QT = QU.



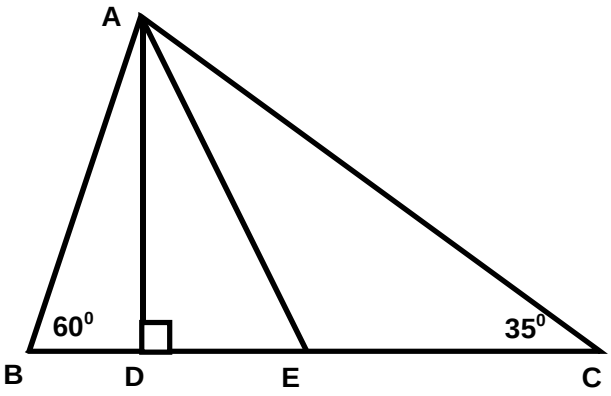
3. ABC is a triangle in which $\angle B = 2\angle C$. D is a point on BC such that AD bisects $\angle BAC$ and AB = CD. Prove that $\angle BAC = 72^0$.

4. In figure if AD is the bisector of $\angle A$, show that: (i) AB > BD (ii) AC > CD.

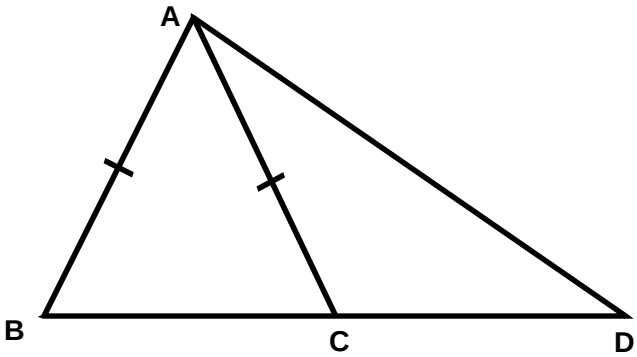


5. If two isosceles triangles have a common base, prove that the line joining the vertices bisects the base at right angle.

6. In given figure AD ⊥ BC, AE is the angle bisector of ∠BAC. Find ∠DAE



7. In given figure, ABC is a triangle in which AB = AC. If D be a point on BC produced, prove that AD > AC.



13. If two sides of a triangle are unequal, prove that the longer side has the greater angle opposite to it.

14. In a triangle, prove that the greater angle has the longer side opposite to it.

15. Prove that the sum of any two sides of a triangle is greater than its third side.

16. If in two right triangles, hypotenuse and one side of a triangle are equal to the hypotenuse and one side of other triangle, prove that the two triangles are congruent

17. Prove that "Angles opposite to equal sides of a triangle are equal".

18. Prove that "If two angles and the included side of one triangle are equal to two angles and the included side of the other triangle, then the two triangles are congruent".

19. Prove that "If two angles and one side of one triangle are equal to two angles and the corresponding side of the other triangle, then the two triangles are congruent"

20. Prove that "If three sides of one triangle are equal to three sides of the other triangle, then the two triangles are congruent".

21. Show that of all line segments drawn from a given point not on it, the perpendicular line segment is the shortest.

22. Show that in a right angled triangle, the hypotenuse is the longest side.

23. Prove that the difference between any two sides of a triangle is less than its third side.

24. In an isosceles triangle, prove that the altitude from the vertex bisects the base.

25. Prove that the perpendiculars drawn from the vertices of equal angles of an isosceles triangle to the opposite sides are equal.

26. Prove that the medians of an equilateral triangle are equal.

27. If D is the midpoint of the hypotenuse AC of a right angled triangle ABC, prove that BD = $\frac{1}{2}$ AC.

28. If the bisector of vertical angle of a triangle bisects the base, prove that the triangle is isosceles.

29. In a right angled triangle, one acute angle is doubled the other. Prove that the hypotenuse is double the smallest side.

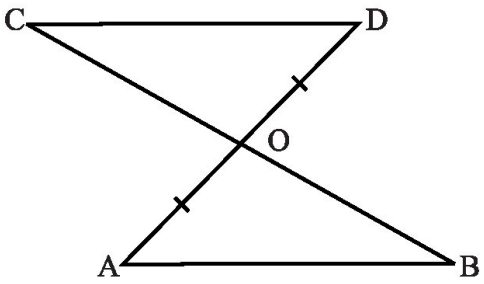
30. Show that the sum of three altitudes of a triangle is less than the sum of the three sides of the triangle.

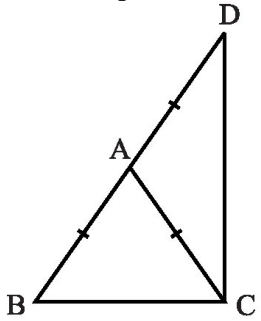
31. Prove that the sum of any two sides of a triangle is greater than twice the median drawn to the third side.

32. Prove that the perimeter of a triangle is greater than the sum of three medians.

33. If O is a point within ΔABC, show that
(i) AB + AC > OB + OC
(ii) AB + BC + CA > OA + OB + OC.
(iii) OA + OB + OC > $\frac{1}{2}$ (AB + BC + CA)

34. Line-segment AB is parallel to another line-segment CD. O is the mid-point of AD (see the adjoining figure). Show that (i) $\Delta AOB \cong \Delta DOC$ (ii) O is also the mid-point of BC.





35. ΔABC is an isosceles triangle in which AB = AC. Side BA is produced to D such that AD = AB (see the above right sided figure). Show that $\angle BCD$ is a right angle.

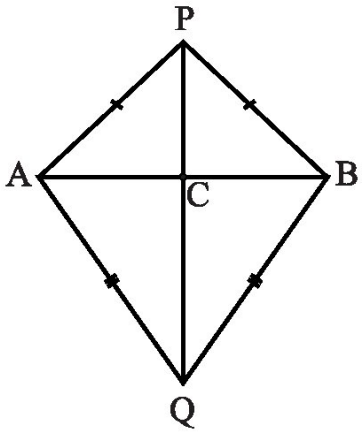
36. D is a point on side BC of ΔABC such that AD = AC. Show that AB > AD.

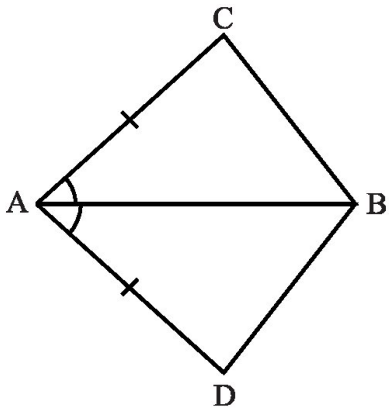
37. AD is an altitude of an isosceles triangle ABC in which AB = AC. Show that (i) AD bisects BC (ii) AD bisects ∠A.

38. AB is a line segment and line *l* is its perpendicular bisector. If a point P lies on *l*, show that P is equidistant from A and B.

39. ABC is a right angled triangle in which ∠A = 90° and AB = AC. Find ∠B and ∠C.

40. AB is a line-segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B(see in the below left figure). Show that the line PQ is the perpendicular bisector of AB.

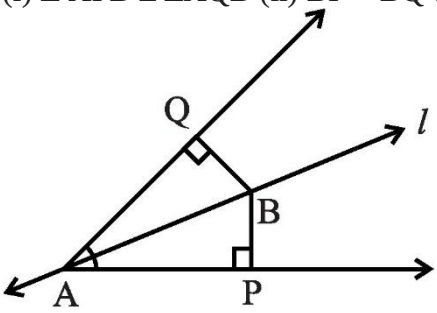


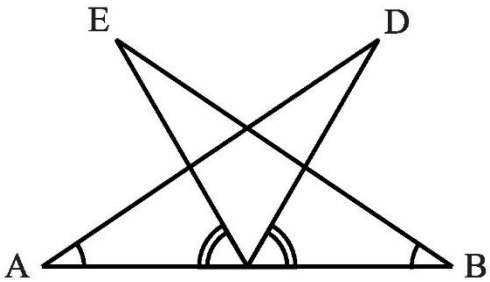


41. In quadrilateral ACBD, AC = AD and AB bisects ∠A (see the above right sided Fig.). Show that Δ ABC≅Δ ABD. What can you say about BC and BD?

42. In an isosceles triangle ABC, with AB = AC, the bisectors of ∠ B and ∠C intersect each other at O. Join A to O. Show that : (i) OB = OC (ii) AO bisects ∠A

43. Line *l* is the bisector of an angle ∠A and B is any point on *l*. BP and BQ are perpendiculars from B to the arms of ∠A (see the above side figure). Show that:
(i) Δ APB ≅ ΔAQB (ii) BP = BQ or B is equidistant from the arms of ∠A.





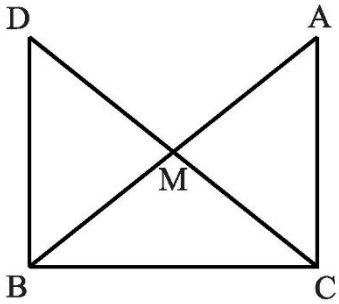
44. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that ∠BAD = ∠ABE and ∠EPA = ∠DPB (see the above right sided figure). Show that (i) ΔDAP ≅ ΔEBP (ii) AD = BE

45. BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

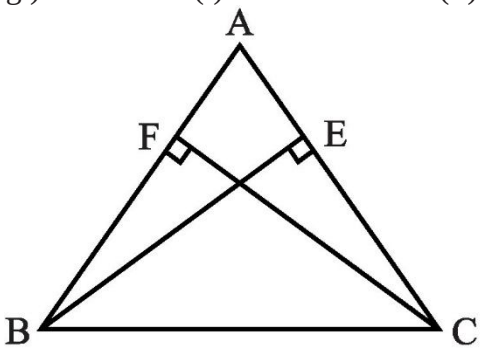
46. ABC is an isosceles triangle with AB = AC. Draw AP □⇔ BC to show that ∠B = ∠C.

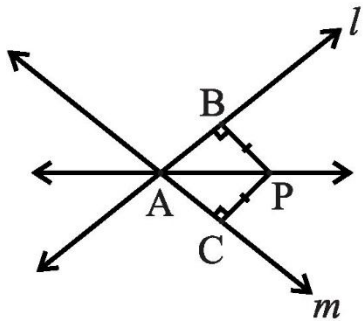
47. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B (see the above side figure). Show that:

(i) $\Delta AMC \cong \Delta BMD$ (ii) $\angle DBC$ is a right angle. (iii) $\Delta DBC \cong \Delta ACB$ (iv) $CM = \frac{1}{2} AB$



48. ABC is a triangle in which altitudes BE and CF to sides AC and AB are equal (see the below Fig.). Show that (i) $\Delta ABE \cong \Delta ACF$ (ii) AB = AC, i.e., ABC is an isosceles triangle.

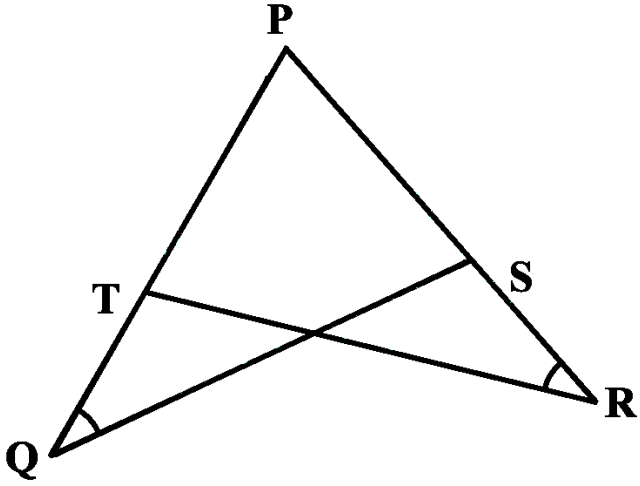


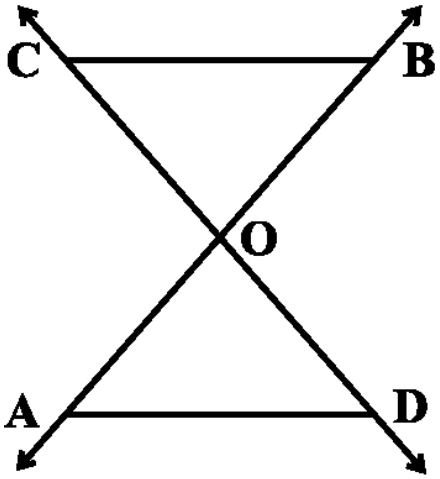


49. P is a point equidistant from two lines *l* and *m* intersecting at point A (see the above right side figure). Show that the line AP bisects the angle between them.

50. The angles of triangle are $(x + 10^0)$, $(2x - 30^0)$ and x^0. Find the value of x.

51. In the below Fig, PQ = PR and $\angle Q = \angle R$. Prove that $\Delta PQS \cong \Delta PRT$.

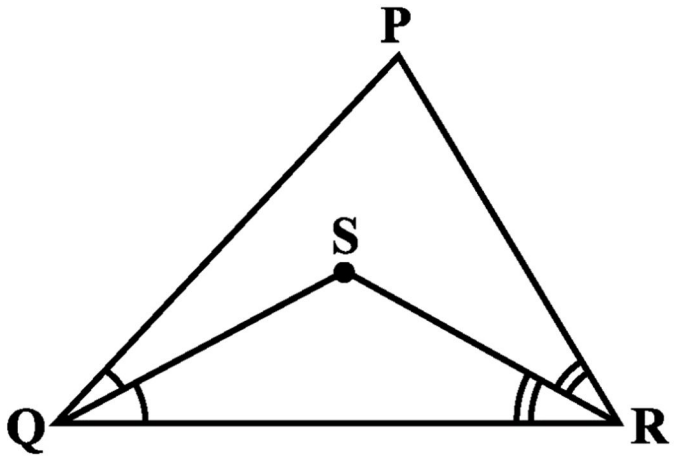




52. In the above right sided Figure, two lines AB and CD intersect each other at the point O such that BC || DA and BC = DA. Show that O is the midpoint of both the line-segments AB and CD.

53. ABC is an isosceles triangle with AB = AC and BD and CE are its two medians. Show that BD = CE.

54. In the below Figure, PQ > PR and QS and RS are the bisectors of ∠Q and ∠R, respectively. Show that SQ > SR.



55. ABCD is quadrilateral such that AB = AD and CB = CD. Prove that AC is the perpendicular bisector of BD.

56. Two lines *l* and *m* intersect at the point O and P is a point on a line *n* passing through the point O such that P is equidistant from *l* and *m*. Prove that *n* is the bisector of the angle formed by *l* and *m*.

57. Line segment joining the mid-points M and N of parallel sides AB and DC, respectively of a trapezium ABCD is perpendicular to both the sides AB and DC. Prove that AD = BC.

58. ABCD is a quadrilateral such that diagonal AC bisects the angles A and C. Prove that AB = AD and CB = CD.

59. ABC is a right triangle such that AB = AC and bisector of angle C intersects the side AB at D. Prove that AC + AD = BC.

60. P is a point on the bisector of ∠ABC. If the line through P, parallel to BA meet BC at Q, prove that BPQ is an isosceles triangle.

61. ABCD is a quadrilateral in which AB = BC and AD = CD. Show that BD bisects both the angles ABC and ADC.

62. ABC is a right triangle with AB = AC. Bisector of □∨A meets BC at D. Prove that BC = 2 AD.

63. O is a point in the interior of a square ABCD such that OAB is an equilateral triangle. Show that ΔOCD is an isosceles triangle.

64. ABC and DBC are two triangles on the same base BC such that A and D lie on the opposite sides of BC, AB = AC and DB = DC. Show that AD is the perpendicular bisector of BC.

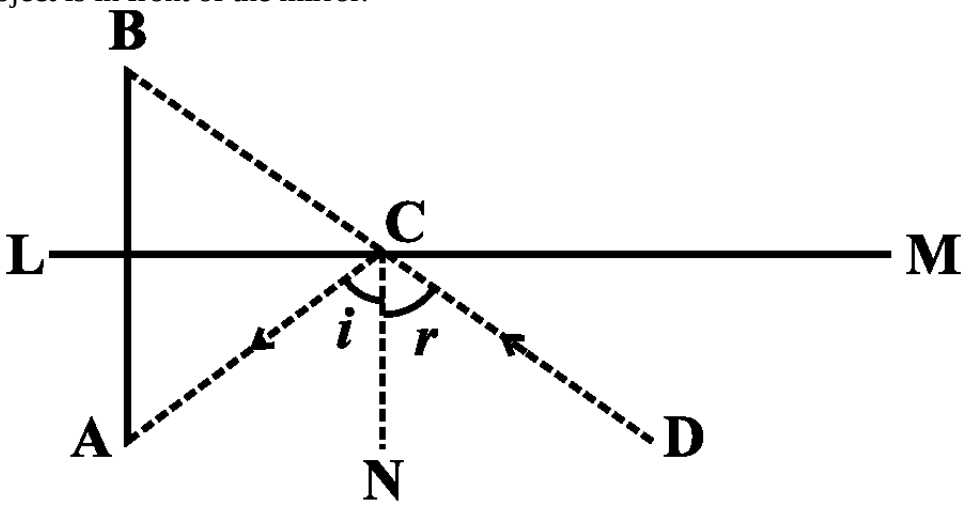
65. ABC is an isosceles triangle in which AC = BC. AD and BE are respectively two altitudes to sides BC and AC. Prove that AE = BD.

66. Prove that sum of any two sides of a triangle is greater than twice the median with respect to the third side.

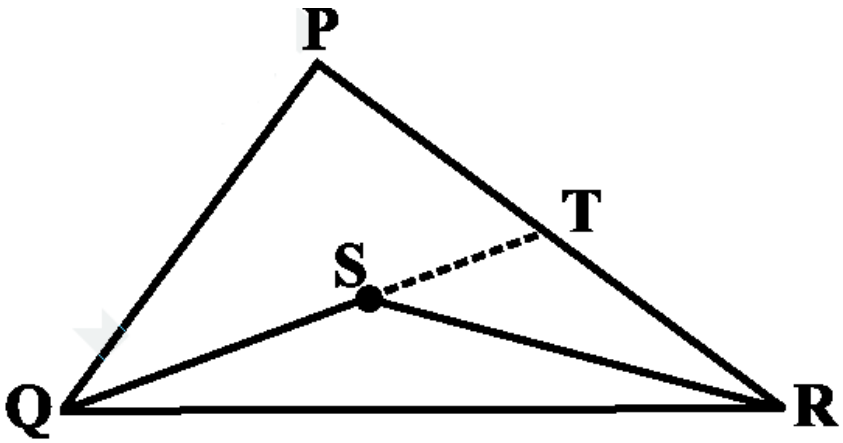
67. Show that in a quadrilateral ABCD, AB + BC + CD + DA < 2 (BD + AC).

68. In a right triangle, prove that the line-segment joining the mid-point of the hypotenuse to the opposite vertex is half the hypotenuse.

69. The image of an object placed at a point A before a plane mirror LM is seen at the point B by an observer at D as shown in below Fig.. Prove that the image is as far behind the mirror as the object is in front of the mirror.



70. S is any point in the interior of ΔPQR. Show that SQ + SR < PQ + PR.



MCQ WORKSHEET-I
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. The sides of a triangular plot are in the ratio of 3 : 5 : 7 and its perimeter is 300 m. Find its area.
(a) $4\sqrt{30}$ (b) $8\sqrt{30}$ (c) $12\sqrt{30}$ (d) $16\sqrt{30}$

2. Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm
(a) $1500\sqrt{3}$ (b) $3000\sqrt{3}$ (c) $4500\sqrt{3}$ (d) $6000\sqrt{3}$

3. Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.
(a) $14\sqrt{11}$ (b) $21\sqrt{11}$ (c) $35\sqrt{11}$ (d) $21\sqrt{11}$

4. Sides of a triangle are in the ratio of 12 : 17 : 25 and its perimeter is 540cm. Find its area.
(a) 6000 (b) 9000 (c) 12000 (d) none of these

5. The height corresponding to the longest side of the triangle whose sides are 42 cm, 34 cm and 20 cm in length is
(a) 15 cm (b) 36 cm (c) 16 cm (d) none of these

6. A park, in the shape of a quadrilateral ABCD, has $\angle C = 90^o$, AB = 9 m, BC = 12 m, CD = 5 m and AD = 8 m. How much area does it occupy?
(a) 56.4 m^2 (b) 55.4 m^2 (c) 65.4 m^2 (d) none of these

7. Find the area of a quadrilateral ABCD in which AB = 3 cm, BC = 4 cm, CD = 4 cm, DA = 5 cm and AC = 5 cm.
(a) 15 cm^2 (b) 15.4 cm^2 (c) 15.2 cm^2 (d) none of these

8. If the area of an equilateral triangle is $81\sqrt{3}$ cm^2, then its height is
(a) $9\sqrt{3}$ (b) $3\sqrt{3}$ (c) $12\sqrt{3}$ (d) none of these

9. A rhombus shaped field has green grass for 18 cows to graze. If each side of the rhombus is 30 m and its longer diagonal is 48 m, how much area of grass field will each cow be getting?
(a) 45 m^2 (b) 48 m^2 (c) 51 m^2 (d) none of these

10. The altitude of a triangular field is one-third of its base. If the cost of sowing the field at Rs 58 per hectare is Rs. 783 then its altitude is
(a) 900 m (b) 600 m (c) 300 m (d) none of these

11. A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm, and the parallelogram stands on the base 28 cm, find the height of the parallelogram.
(a) 12 cm (b) 15 cm (c) 18 cm (d) none of these

12. Area of equilateral triangle of side a unit is
(a) $\frac{\sqrt{3}}{2}a^2$ (b) $\frac{\sqrt{3}}{4}a^2$ (c) $\frac{\sqrt{3}}{2}a$ (d) none of these

MCQ WORKSHEET-II
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. The height of an equilateral triangle is 6 cm, then the area of the triangle is
(a) $15\sqrt{3}$ (b) $3\sqrt{3}$ (c) $12\sqrt{3}$ (d) none of these

2. The area of an isosceles triangle each of whose equal sides is 13 m and whose base is 24 m =
(a) 45 m^2 (b) 48 m^2 (c) 60 m^2 (d) none of these

3. The base of an isosceles triangle is 24 cm and its area is 192 cm^2, then its perimeter is
(a) 64 cm (b) 65 cm (c) 68 cm (d) none of these

4. The difference between the sides at right angles in a right angled triangle is 14 cm. If the area of the triangle is 120 cm^2, then the perimeter of the triangle is
(a) 64 cm (b) 60 cm (c) 68 cm (d) none of these

5. The base of a triangular field is three times its altitudes. If the cost of sowing the field at Rs 58 per hectare is Rs. 783 then its base is
(a) 900 m (b) 600 m (c) 1200 m (d) none of these

6. The length of altitude of a equilateral triangle of side a unit is
(a) $\frac{\sqrt{3}}{2}a^2$ (b) $\frac{\sqrt{3}}{4}a^2$ (c) $\frac{\sqrt{3}}{2}a$ (d) none of these

7. The area of the triangle whose sides are 42 cm, 34 cm and 20 cm in length is
(a) 150 cm^2 (b) 336 cm^2 (c) 300 cm^2 (d) none of these

8. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle in cm^2 is.
(a) $9\sqrt{15}$ (b) $12\sqrt{15}$ (c) $6\sqrt{15}$ (d) none of these

9. The height corresponding to the longest side of the triangle whose sides are 91 cm, 98 cm and 105 cm in length is
(a) 76.4 cm (b) 78.4 cm (c) 65.4 cm (d) none of these

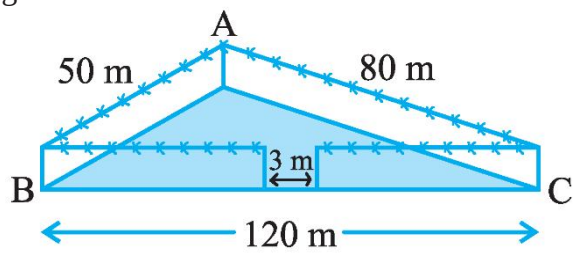
10. If the area of an equilateral triangle is $36\sqrt{3}$ cm^2, then its perimeter is
(a) 64 cm (b) 60 cm (c) 36 cm (d) none of these

11. The base of a right angled triangle is 48 cm and its hypotenuse is 50 cm then its area is
(a) 150 cm^2 (b) 336 cm^2 (c) 300 cm^2 (d) none of these

12. A field is in the shape of a trapezium whose parallel sides are 25 m and 10 m. The non-parallel sides are 14 m and 13 m. Find the area of the field.
(a) 89.4 m^2 (b) 89.075 m^2 (c) 89.75 m^2 (d) none of these

MCQ WORKSHEET-III
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. A triangular park ABC has sides 120m, 80m and 50m . A gardener *Dhania* has to put a fence all around it and also plant grass inside. How much area in m^2 does she need to plant?



(a) $9\sqrt{15}$ (b) $12\sqrt{15}$ (c) $6\sqrt{15}$ (d) none of these

2. The sides of a triangle are 35 cm, 54 cm and 61 cm, respectively. The length of its longest altitude:
(a) $16\sqrt{5}$ cm (b) $10\sqrt{5}$ cm (c) $24\sqrt{5}$ cm (d) 28 cm

3. If the area of an equilateral triangle is $16\sqrt{3}\ cm^2$, then the perimeter of the triangle is:
(a) 64 cm (b) 60 cm (c) 36 cm (d) none of these

4. The length of each side of an equilateral triangle having an area of $9\sqrt{3}\ cm^2$ is:
(a) 8 cm (b) 6 cm (c) 36 cm (d) 4 cm

5. The area of an equilateral triangle with side is:
(a) 5.196 cm^2 (b) 0.866 cm^2 (c) 3.4896 cm^2 (d) 1.732 cm^2

6. The sides of a triangle are 56 cm, 60 cm and 52 cm, then the area of the triangle is:
(a) 1322 cm^2 (b) 1311 cm^2 (c) 1344 cm^2 (d) 1392 cm^2

7. The perimeter of an equilateral triangle is 60 m. The area is:
(a) $15\sqrt{3}\ m^2$ (b) $3\sqrt{3}\ m^2$ (c) $12\sqrt{3}\ m^2$ (d) none of these

8. An isosceles right triangle has area 8 cm^2, then length of its hypotenuse is
(a) $\sqrt{32}cm$ (b) $\sqrt{16}cm$ (c) $\sqrt{48}cm$ (d) $\sqrt{24}cm$

9. A traffic signal board indicating 'SCHOOL AHEAD' is an equilateral triangle with side a, then area of the traffic signal is:
(a) $\frac{\sqrt{3}}{2}a^2$ (b) $\frac{\sqrt{3}}{4}a^2$ (c) $\frac{\sqrt{3}}{2}a$ (d) none of these

10. The base of a triangle is 12 cm and height is 8 cm, then the area of a triangle is:
(a) 24 cm^2 (b) 96 cm^2 (c) 48 cm^2 (d) 56 cm^2

MCQ WORKSHEET-IV
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. The sides of a triangle are 3 cm , 4 cm and 5 cm. Its area is
(a) 12 cm^2 (b) 15 cm^2 (c) 6 cm^2 (d) 9 cm^2

2. The area of isosceles triangle whose equal sides are equal to 3 cm and other side is 4 cm. Its area is
(a) 20 cm^2 (b) $4\sqrt{5}$ cm^2 (c) $2\sqrt{5}$ cm^2 (d) 10 cm^2

3. The area of a triangular sign board of sides 5 cm , 12 cm and 13 cm is
(a) $\frac{65}{2}$ cm^2 (b) 30 cm^2 (c) 60 cm^2 (d) 12 cm^2

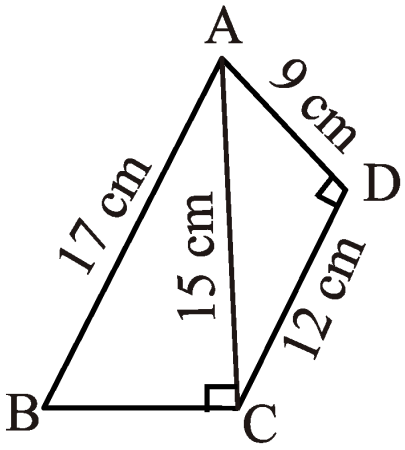
4. The side of a triangle are in the ratio of 25 : 14 : 12 and its perimeter is 510m. The greatest side of the triangle is
(a) 120 m (b) 170 m (c) 250 m (d) 270 m

5. The perimeter of a right triangle is 60 cm and its hypotenuse is 26 cm. The other two sides of the triangle are
(a) 24 cm. 10 cm (b) 25 cm. 9 cm (c) 20 cm. 14 cm (d) 26 cm. 8 cm

6. The area of quadrilateral ABCD in which AB = 3 cm, BC = 4 cm, CD = 4 cm, DA = 5 cm and AC = 5 cm is
(a) 15.2 cm^2 (b) 14.8 cm^2 (c) 15 cm^2 (d) 16.4 cm^2

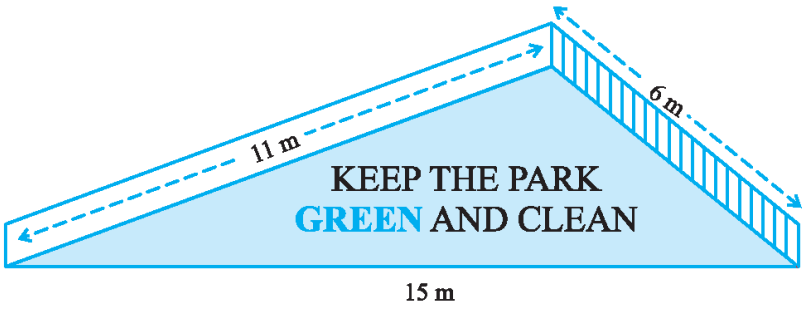
7. The area of trapezium in which the parallel sides are 28 m and 40 m, non parallel sides are 9 m and 15 m is
(a) 286 m^2 (b) 316 m^2 (c) 306 m^2 (d) 296 m^2

8. The area of quadrilateral ABCD in the below figure is
(a) 57 cm^2 (b) 95 cm^2 (c) 102 cm^2 (d) 114 cm^2



9. A traffic signal board indicating 'SCHOOL AHEAD' is an equilateral triangle with side a, then height of the traffic signal is:
(a) $\frac{\sqrt{3}}{2}a^2$ (b) $\frac{\sqrt{3}}{4}a^2$ (c) $\frac{\sqrt{3}}{2}a$ (d) none of these

10. There is a slide in a park. One of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the wall are 15 m, 11 m and 6 m, The area painted in colour is:



(a) $10\sqrt{2}$ m^2 (b) $20\sqrt{2}$ m^2 (c) $30\sqrt{2}$ m^2 (d) none of these

11. An isosceles right triangle has area 8 cm2. The length of its hypotenuse is
(a) $\sqrt{32}$ cm (b) $\sqrt{16}$ cm (c) $\sqrt{48}$ cm (d) $\sqrt{24}$ cm

12. The edges of a triangular board are 6 cm, 8 cm and 10 cm. The cost of painting it at the rate of 9 paise per cm2 is
(a) Rs 2.00 (b) Rs 2.16 (c) Rs 2.48 (d) Rs 3.00

13. The area of an isosceles triangle having base 2 cm and the length of one of the equal sides 4 cm, is
(a) $\sqrt{15}$ cm^2 (b) $\sqrt{\frac{15}{2}}$ cm^2 (c) $2\sqrt{15}$ cm^2 (d) $4\sqrt{15}$ cm^2

14. The sides of a triangle are 35 cm, 54 cm and 61 cm, respectively. The length of its longest altitude
(a) $16\sqrt{5}$ cm (b) $10\sqrt{5}$ cm (c) $24\sqrt{5}$ cm (d) 28 cm

15. If the area of an equilateral triangle is $16\sqrt{3}$ cm2, then the perimeter of the triangle is
(a) 48 cm (b) 24 cm (c) 12 cm (d) 36 cm

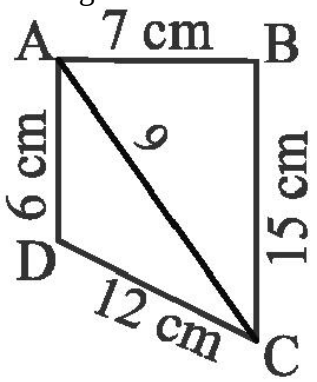
PRACTICE QUESTIONS
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. Find the area of a triangle whose sides are 35 cm, 45 cm and 50 cm.

2. An isosceles triangle has perimeter 30 cm and each of its equal sides is 12 cm. Find its area. (use $\sqrt{15} = 3.88$)

3. The measure of one side of a right triangular field is 4.2 m. If the difference of the lengths of hypotenuse and the other is 14m, find the sides of the triangle and its area.

4. Find the area of the quadrilateral ABCD given in the below figure



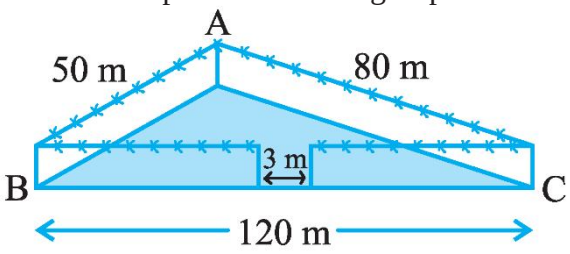
5. The perimeter of a rhombus is 40cm. If one of its diagonal is 16cm, find the area of the rhombus.

6. Two parallel sides of a trapezium are 60cm and 77cm and the other sides are 25cm and 26cm. Find the area of the trapezium.

7. Find the area of quadrilateral ABCD in which AD = 24cm, ∠BAD = 900 and B, C and D form an equilateral triangle of side 26cm. (use $\sqrt{3} = 1.73$)

8. The height of an equilateral triangle measures 9cm. Find its area, correct to two places of decimals (use $\sqrt{3} = 1.73$)

9. A triangular park ABC has sides 120m, 80m and. A gardener *Dhania* has to put a fence all around it and also plant grass inside. How much area does she need to plant? Find the cost of fencing it with barbed wire at the rate of Rs 20 per metre leaving a space 3m wide for a gate on one side.

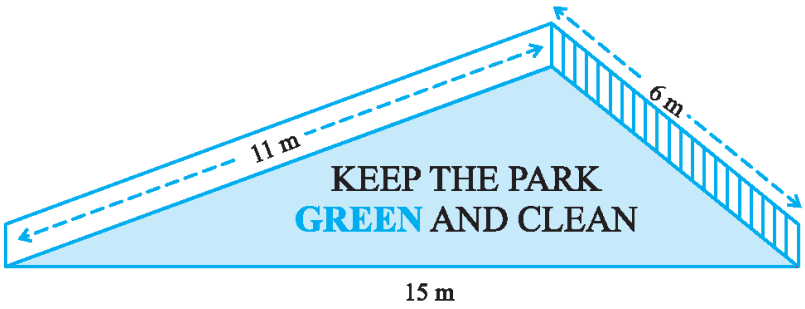


10. A traffic signal board, indicating 'SCHOOL AHEAD', is an equilateral triangle with side '*a*'. Find the area of the signal board, using Heron's formula. If its perimeter is 180 cm, what will be the area of the signal board?

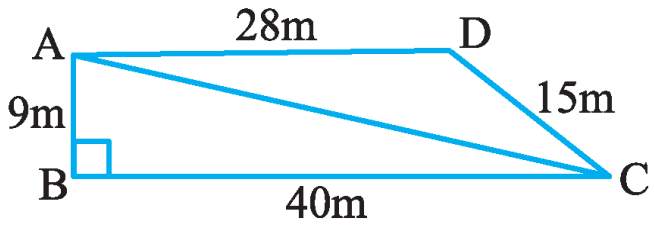
11. A park, in the shape of a quadrilateral ABCD, has ∠C = 90º, AB = 9 m, BC = 12 m, CD = 5 m and AD = 8 m. How much area does it occupy?

12. Find the area of a quadrilateral ABCD in which AB = 3 cm, BC = 4 cm, CD = 4 cm, DA = 5 cm and AC = 5 cm.

13. There is a slide in a park. One of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the wall are 15 m, 11 m and 6 m, find the area painted in colour.



14. Students of a school staged a rally for cleanliness campaign. They walked through the lanes in two groups. One group walked through the lanes AB, BC and CA; while the other through AC, CD and DA. Then they cleaned the area enclosed within their lanes. If AB = 9 m, BC = 40 m, CD = 15 m, DA = 28 m and $\angle B = 90^\circ$, which group cleaned more area and by how much? Find the total area cleaned by the students (neglecting the width of the lanes).



15. Sanya has a piece of land which is in the shape of a rhombus. She wants her one daughter and one son to work on the land and produce different crops. She divided the land in two equal parts. If the perimeter of the land is 400 m and one of the diagonals is 160 m, how much area each of them will get for their crops?

16. Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm.

17. A triangle has sides 35 cm, 54 cm and 61 cm long. Find its area. Also find smallest of its altitudes.

18. The sides of a triangular plot are in the ratio 3 : 5 : 7 and its perimeter is 300 m. Find its area.

19. A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm, and the parallelogram stands on the base 28 cm, find the height of the parallelogram.

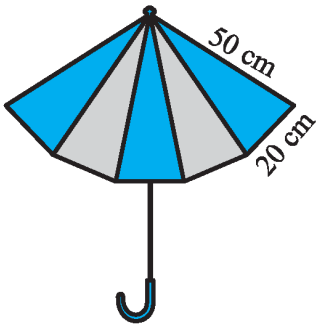
20. A rhombus shaped field has green grass for 18 cows to graze. If each side of the rhombus is 30 m and its longer diagonal is 48 m, how much area of grass field will each cow be getting?

21. Sides of a triangle are in the ratio of 12 : 17 : 25 and its perimeter is 540cm. Find its area.

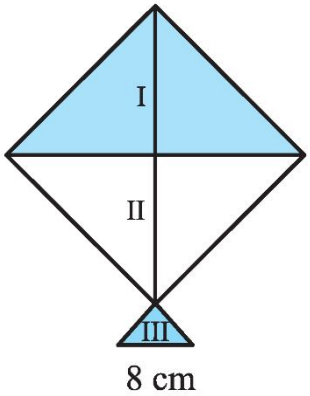
22. The base of an isosceles triangle is 10 cm and one of its equal sides is 13 cm. Find its area.

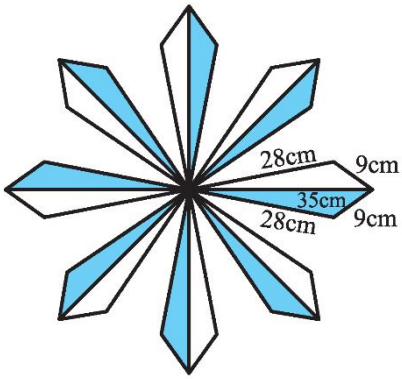
23. Find the area of a right triangle in which the sides containing the right angle measure 20 cm and 15 cm.

24. An umbrella is made by stitching 10 triangular pieces of cloth of two different colours each piece measuring 20 cm, 50 cm and 50 cm. How much cloth of each colour is required for the umbrella?



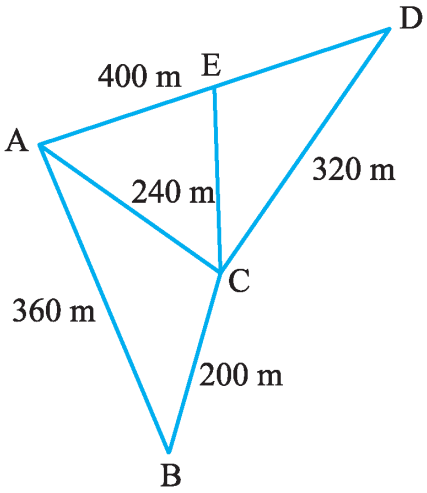
25. A kite in the shape of a square with a diagonal 32 cm and an isosceles triangle of base 8 cm and sides 6 cm each is to be made of three different shades as shown in Fig.. How much paper of each shade has been used in it?





26. A floral design on a floor is made up of 16 tiles which are triangular, the sides of the triangle being 9 cm, 28 cm and 35 cm. Find the cost of polishing the tiles at the rate of 50p per cm^2.

27. Kamla has a triangular field with sides 240 m, 200 m, 360 m, where she grew wheat. In another triangular field with sides 240 m, 320 m, 400 m adjacent to the previous field, she wanted to grow potatoes and onions. She divided the field in two parts by joining the mid-point of the longest side to the opposite vertex and grew patatoes in one part and onions in the other part. How much area (in hectares) has been used for wheat, potatoes and onions? (1 hectare = 10000 m^2).



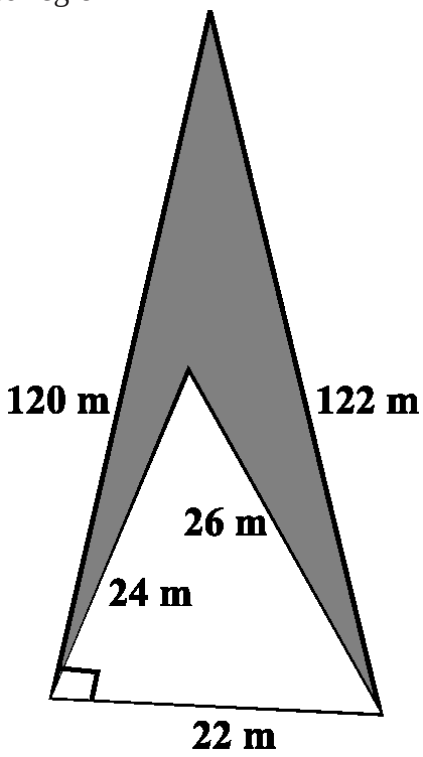
28. A field is in the shape of a trapezium whose parallel sides are 25 m and 10 m. The non-parallel sides are 14 m and 13 m. Find the area of the field.

29. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.

30. Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.

31. The sides of a triangular field are 41 m, 40 m and 9 m. Find the number of rose beds that can be prepared in the field, if each rose bed, on an average needs 900 cm^2 space.

32. Calculate the area of the shaded region in



33. Find the cost of laying grass in a triangular field of sides 50 m, 65 m and 65 m at the rate of Rs 7 per m^2.

34. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 13 m, 14 m and 15 m. The advertisements yield an earning of Rs 2000 per m^2 a year. A company hired one of its walls for 6 months. How much rent did it pay?

35. From a point in the interior of an equilateral triangle, perpendiculars are drawn on the three sides. The lengths of the perpendiculars are 14 cm, 10 cm and 6 cm. Find the area of the triangle.

36. The perimeter of an isosceles triangle is 32 cm. The ratio of the equal side to its base is 3 : 2. Find the area of the triangle.

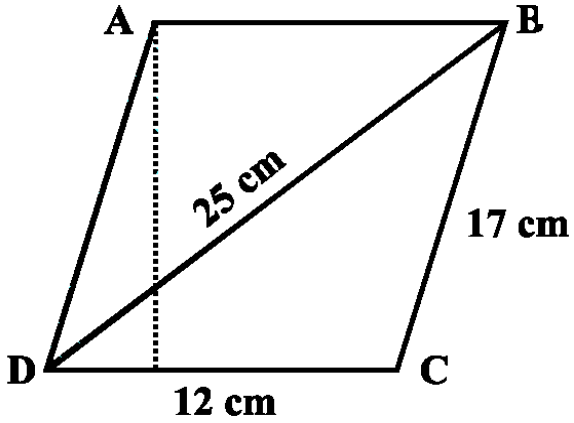
37. A field in the form of a parallelogram has sides 60 m and 40 m and one of its diagonals is 80 m long. Find the area of the parallelogram.

38. The perimeter of a triangular field is 420 m and its sides are in the ratio 6 : 7 : 8. Find the area of the triangular field.

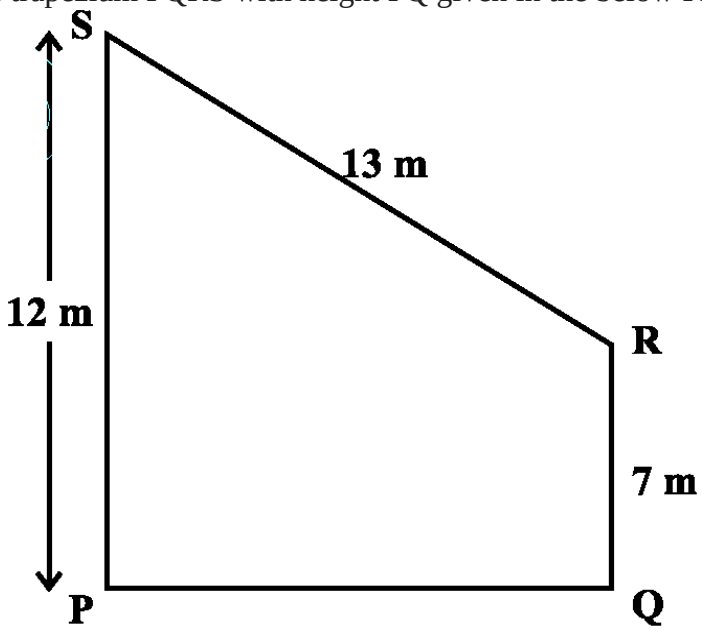
39. The sides of a quadrilateral ABCD are 6 cm, 8 cm, 12 cm and 14 cm (taken in order) respectively, and the angle between the first two sides is a right angle. Find its area.

40. A rhombus shaped sheet with perimeter 40 cm and one diagonal 12 cm, is painted on both sides at the rate of Rs 5 per m^2. Find the cost of painting.

41. Find the area of a parallelogram given in the below Figure. Also find the length of the altitude from vertex A on the side DC.



42. Find the area of the trapezium PQRS with height PQ given in the below Figure



43. If each side of a triangle is doubled, then find the ratio of area of the new triangle thus formed and the given triangle.

44. The perimeter of a triangle is 50 cm. One side of a triangle is 4 cm longer than the smaller side and the third side is 6 cm less than twice the smaller side. Find the area of the triangle.

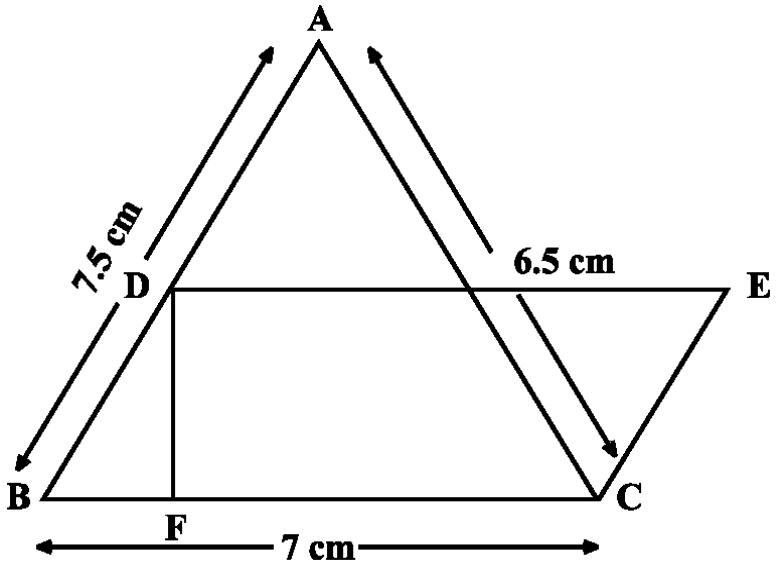
45. The area of a trapezium is 475 cm^2 and the height is 19 cm. Find the lengths of its two parallel sides if one side is 4 cm greater than the other.

46. A rectangular plot is given for constructing a house, having a measurement of 40 m long and 15 m in the front. According to the laws, a minimum of 3 m, wide space should be left in the front and back each and 2 m wide space on each of other sides. Find the largest area where house can be constructed.

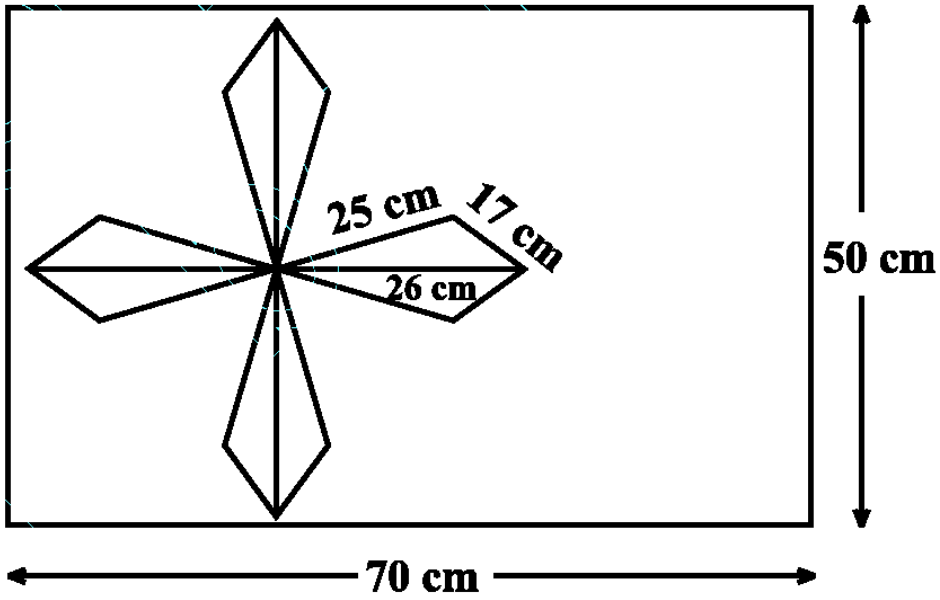
47. A field is in the shape of a trapezium having parallel sides 90 m and 30 m. These sides meet the third side at right angles. The length of the fourth side is 100 m. If it costs Rs 4 to plough $1m^2$ of the field, find the total cost of ploughing the field.

48. The sides of a triangle are 35 cm, 54 cm and 61 cm, respectively. Find the length of its longest altitude.

49. In the below Fig, ΔABC has sides AB = 7.5 cm, AC = 6.5 cm and BC = 7 cm. On base BC a parallelogram DBCE of same area as that of ΔABC is constructed. Find the height DF of the parallelogram.



50. A design is made on a rectangular tile of dimensions 50 cm × 70 cm as shown in below Figure. The design shows 8 triangles, each of sides 26 cm, 17 cm and 25 cm. Find the total area of the design and the remaining area of the tile.



MCQ WORKSHEET-I
CLASS IX: CHAPTER - 14
STATISTICS

1. Class mark and class size of the class interval are 25 and 10 respectively then the class interval is
(a) 20 – 30 (b) 30 – 40 (c) 40 – 50 (d) 50 – 60

2. Class mark of the 1st class interval is 5 and there are five classes. If the class size is 10 then the last class interval is
(a) 20 – 30 (b) 30 – 40 (c) 40 – 50 (d) 50 – 60

3. The median of the following data is

x	5	10	15	25	30
f	4	6	7	3	5

(a) 10 (b) 15 (c) 25 (d) 30

4. The mode in the above frequency distribution table is
(a) 10 (b) 15 (c) 25 (d) 30

5. The mean of the following data is

x	5	10	15	20	25	30
f	4	5	3	2	3	3

(a) 15 (b) 16 (c) 17 (d) none of these

6. The median of first ten prime numbers is
(a) 11 (b) 12 (c) 13 (d) none of these.

7. The mean of first ten multiples of 5 is
(a) 45 (b) 55 (c) 65 (d) none of these.

8. The mean of first ten multiples of 2 is
(a) 11 (b) 12 (c) 13 (d) none of these.

9. The median of first ten multiples of 3 is
(a) 15 (b) 16 (c) 16.5 (d) none of these.

10. The median of the following data is

x	10	20	30	40	50	60
f	4	5	6	7	2	3

(a) 20 (b) 30 (c) 40 (d) none of these

11. The median of the following data is

25	72	28	65	29	60	30	54	32	53
33	52	35	51	42	48	45	47	46	33

(a) 45 (b) 45.5 (c) 46 (d) none of these

12. Calculate the median income from the following data:

Income (in Rs,	10	20	30	40
No. of persons	2	4	10	4

(a) 20 (b) 30 (c) 40 (d) none of these

MCQ WORKSHEET-II
CLASS IX: CHAPTER - 14
STATISTICS

1. Class mark of class 150 – 160 is
(a) 150 (b) 160 (c) 155 (d) none of these.

2. Average of numbers: 10, 8, 9, 7, 8 is
(a) 8.4 (b) 7.4 (c) 4.8 (d) 8.2.

3. Mean of first 10 natural numbers is
(a) 6.5 (b) 5.5 (c) 7.5 (d) 8.5.

4. The heights (in cm) of 9 students of a class are as follows:
155, 160, 145, 149, 150, 147, 152, 144, 148
Find the median of this data.
(a) 150 (b) 147 (c) 149 (d) 148

5. The points scored by a Kabaddi team in a series of matches are as follows
17, 2, 7, 27, 15, 5, 14, 8, 10, 24, 48, 10, 8, 7, 18, 28
Find the median of the points scored by the team.
(a) 12 (b) 15 (c) 24 (d) 28

6. Find the mode of the following marks (out of 10) obtained by 20 students:
4, 6, 5, 9, 3, 2, 7, 7, 6, 5, 4, 9, 10, 10, 3, 4, 7, 6, 9, 9
(a) 4 (b) 7 (c) 10 (d) 9

7. 5 people were asked about the time in a week they spend in doing social work in their community. They said 10, 7, 13, 20 and 15 hours, respectively. Find the mean (or average) time in a week devoted by them for social work.
(a) 12 (b) 13 (c) 14 (d) none of these.

8. The width of each of five continuous classes in a frequency distribution is 5 and the lower class limit of the lowest class limit of the lowest class is 10. The upper class limit of the highest class is:
(a) 35 (b) 15 (c) 25 (d) 40

9. Let m be the midpoint and 'l' the upper class limit of a class in a continuous frequency distribution. The lower class limit of the class is
(a) 2m + l (b) 2m – l (c) m - l (d) m – 2l

10. The class marks of a frequency distribution are given as follows: 15, 20,25, …… The class corresponding to the class mark 20 is
(a) 12.5 – 17.5 (b) 17.5 – 22.5 (c) 22.5 – 27.5 (d) 27.5 – 32.5

11. In the class intervals 10 – 20, 20 – 30, the cumber 20 is included in.
(a) 10 – 20 (b) 20 – 30 (c) both the interval (d) none of these intervals

12. The mean of 5 numbers is 30. If one number is excluded, their mean becomes 28. The excluded number is
(a) 28 (b) 30 (c) 35 (d) 38.

MCQ WORKSHEET-III
CLASS IX: CHAPTER - 14
STATISTICS

1. Class mark of class 150 – 160 is
(a) 150 (b) 160 (c) 155 (d) none of these.

2. A grouped frequency distribution table with class intervals of equal sizes using 250 – 270 as one of the class interval is constructed for the following data:
268, 220, 368, 258, 242, 310, 272, 342, 310, 290, 300, 320, 319, 304, 402, 318, 406, 292, 354, 278, 210, 240, 330, 316, 406, 215, 258, 236
The frequency of the class 310 – 330 is
(a) 4 (b) 5 (c) 6 (d) 7.

3. To draw a histogram to represent the following frequency distribution: the adjusted frequency for the class interval 25 – 45 is

C. I.	5 – 10	10 – 15	15 – 25	25 – 45	45 – 75
f	6	12	10	8	15

(a) 6 (b) 5 (c) 2 (d) 3

4. If the mean of the observations: x, x + 3, x + 5, x + 7, x + 10 is 9, the mean of the last three observations is
(a) $10\frac{1}{3}$ (b) $10\frac{2}{3}$ (c) $11\frac{1}{3}$ (d) $11\frac{2}{3}$

5. If $\bar{x}$ represents the mean of n observations $x_1, x_2, x_3, \ldots\ldots x_n$, then the value of $\sum_{i=1}^{n}\left(x_i - \bar{x}\right)$ is
(a) –1 (b) 0 (c) 1 (d) n – 1 .

6. If each observation of the data is increased by 5 then their mean
(a) remains the same (b) becomes 5 times the original mean
(c) is decreased by 5 (d) is increased by 5.

7. There are 50 numbers. Each number s subtracted from 53 and the mean of the number so obtained is found to be 3.5. The mean of the given number is
(a) 46.5 (b) 49.5 (c) 53.5 (d) 56.5.

8. The mean of 25 observations is 36. Out of these observations if the men of first 13 observations is 32 and that of the last 13 observations is 40, the 13^{th} observation is
(a) 23 (b) 36 (c) 38 (d) 40.

9. The median of the data 78, 56, 22, 34, 45, 54, 39, 68, 54, 84 is
(a) 45 (b) 49.5 (c) 54 (d) 56.

10. For drawing a frequency polygon of a continuous frequency distribution, we plot the points whose ordinates are the frequency of the respective classes and abscissa re respectively
(a) upper limits of the classes (b) lower limits of the classes
(c) class marks of the classes (d) upper limits of preceding classes.

MCQ WORKSHEET-IV
CLASS IX: CHAPTER - 14
STATISTICS

1. The range of the data 14, 27, 29, 61, 45, 15, 9, 18 is

A. 61 B. 52 C. 47 D. 53

2. The class mark of the class 120-150 is

A. 120 B. 130 C. 135 D. 150

3. The class mark of a class is 10 and its class width is 6. The lower limit of the class is

A. 5 B. 7 C. 8 D. 10

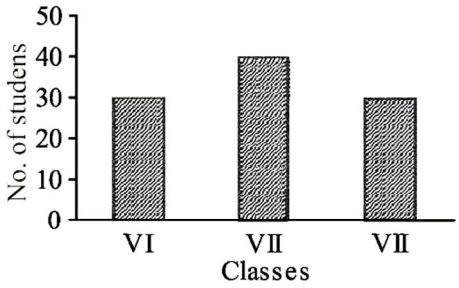
4. In a frequency distribution, the class-width is 4 and the lower limit of first class is 10. If there are six classes, the upper limit of last class is

A. 22 B. 26 C. 30 D. 34

5. The class marks of a distribution are 15, 20, 25, ..., 45. The class corresponding to 45 is

A. 12.5 – 17.5 B. 22.5 – 27.5 C. 42.5 – 47.5 D. None of these

6. The number of students in which two classes are equal.



A. VI and VIII B. VI and VII C. VII and VIII D. None

7. The mean of first five prime numbers is

A. 5.0 B. 4.5 C. 5.6 D. 6.5

8. The mean of first ten multiples of 7 is

A. 35.0 B. 36.5 C. 38.5 D. 39.2

9. The mean of $x + 3$, $x - 2$, $x + 5$, $x + 7$ and $x + 72$ is

A. $x + 5$ B. $x + 2$ C. $x + 3$ D. $x + 7$

10. If the mean of n observations $x_1, x_2, x_3, \ldots\ldots, x_n$ is $\bar{x}$ then $\sum_{l-1}^{n} x_i - \bar{x}$ is

A. 1 B. –1 C. zero D. can not be found

11. The mean of 10 observation is 42. If each observation in the data is decreased by 12, the new mean of the data is

A. 12 B. 15 C. 30 D. 54

12. The the mean of 10 numbers is 15 and that of another 20 number is 24 then the mean of all 30 observations is

A. 20 B. 15 C. 21 D. 24

13. The median of 10, 12, 14, 16, 18, 20 is

A. 12 B. 14 C. 15 D. 16

14. If the median of 12, 13, 16, $x + 2$, $x + 4$, 28, 30, 32 is 23, when $x + 2$, $x + 4$ lie between 16 and 30, then the value of x is

A. 18 B. 19 C. 20 D. 22

15. If the mode of 12, 16, 19, 16, x, 12, 16, 19, 12 is 16, then the value of x is

A. 12 B. 16 C. 19 D. 18

16. The mean of the following data is

x_i	5	10	15	20	25
fi	3	5	8	3	1

A. 12 B. 13 C. 13.5 D. 13.6

PRACTICE QUESTIONS
CLASS IX: CHAPTER - 14
STATISTICS

1. Find the true class limits of the first two classes of the distibution 1–9, 10–19, 20–29, ...

2. The following are the marks obtained by 20 students in a class-test :
40, 22, 36, 27, 30, 12, 15, 20, 25, 31, 34, 36, 39, 41, 43, 48, 46, 36, 37, 40
Arrange the above data in frequency distribution with equal classes, one of them being (0–10), 10 not included.

3. The electricity bills of twenty house holds in a locality are as follows :
370, 410, 520, 270, 810, 715, 1080, 712, 802, 775, 310, 375, 412, 420, 370, 218, 240, 250, 610, 570. Construct a frequency distribution table with class size 100.

4. The enrolment in classes VI to X of a school is given below :

Class :	VI	VII	VIII	IX	X
Enrolment :	70	65	60	45	35

Draw a bar chart to depict the data.

5. Draw a histogram and a frequency polygon for the following data :

Marks	10-20	20-30	30-40	40-50	50-60
No. of students	8	12	15	9	6

6. Draw a histogram for the following data :

Classes	10-15	15-20	20-30	30-50	50-80
Frequency	6	10	10	8	18

7. Find the mean of the following data :
153, 140, 148, 150, 154, 142, 146, 147

8. The mean of the following data is 37. Find x
28, 35, 25, 32, x, 40, 45, 50

9. If the mean of n observation $2x_1$, $2x_2$, ..., $2x_n$ is $2\bar{x}$, show that $\sum_{i=1}^{n}(x_i - 2\bar{x}) = 0$

10. The mean of 20 observations is 25. If each observation is multiplied by 2, then find the mean of new observations.

11. The means of two groups of 15 and 20 observations are 20 and 25 respectively. Find the mean of all the 35 observations.

12. If the mode of the following data is 14, find the value of x
10, 12, 14, 15, 16, 14, 15, 14, 15, x, 16, 14, 16

13. The median of the observations, arranged in increasing order is 26. Find the value of x.
10, 17, 22, $x + 2$, $x + 4$, 30, 36, 40

14. Find the mode of 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18.

15. Find the mean salary of 60 workers of a factory from the following table:

Salary (Rs)	Number of workers
3000	16
4000	12
5000	10
6000	8
7000	6
8000	4
9000	3
10000	1
Total	**60**

16. 100 surnames were randomly picked up from a local telephone directory and frequency distributions of the number of letters in the English alphabet in the surnames was found as follows:

Number of letters	Number of surnames
1 – 4	6
4 – 6	30
6 – 8	44
8 – 12	16
12 – 20	4

(i) Draw a histogram to depict the given information.
(ii) Write the class interval in which the maximum number if surnames lie.

17. In a mathematics test given to 15 students, the following marks (out of 100) are recorded:
41, 39, 48, 52, 46, 62, 54, 40, 96, 52, 98, 40, 42, 52, 60
Find the mean, median and mode of this data.

18. A family with a monthly income of Rs 20,000 had planned the following expenditures per month under various heads: Draw a bar graph for the given below data.

Heads	Expenditure (in thousand rupees)
Grocery	4
Rent	5
Education of children	5
Medicine	2
Fuel	2
Entertainment	1
Miscellaneous	1

19. The value of π upto 50 decimal places is given below:
3.14159265358979323846264338327950288419716939937510 (i) Make a frequency distribution of the digits from 0 to 9 after the decimal point. (ii) What are the most and the least frequently occurring digits?

20. The following observations have been arranged in ascending order as 29, 32, 48, 50, x, $x + 2$, 72, 78, 84, 95. If the median of the data is 63, find the value of x.

21. Consider the marks, out of 100, obtained by 51 students of a class in a test, given in below table. Draw a frequency polygon corresponding to this frequency distribution table.

Marks	Number of students
0 - 10	5
10 - 20	10
20 - 30	4
30 - 40	6
40 - 50	7
50 - 60	3
60 - 70	2
70 - 80	2
80 - 90	3
90 - 100	9
Total	51

22. In a city, the weekly observations made in a study on the cost of living index are given below in the following table: Draw a frequency polygon for the data above (without constructing a histogram).

Cost of living index	Number of weeks
140 - 150	5
150 - 160	10
160 - 170	20
170 - 180	9
180 - 190	6
190 - 200	2
Total	52

23. The following table gives the life times of 400 neon lamps: (i) Represent the given information with the help of a histogram. (ii) How many lamps have a life time of more than 700 hours?

Life time (in hours)	Number of lamps
300 – 400	14
400 – 500	56
500 – 600	60
600 – 700	86
700 – 800	74
800 – 900	62
900 – 1000	48

24. The mean of 13 observations is 14. If the mean of the first 7 observations is 12 and that of last 7 observation is 16, find the 7^{th} observation.

25. The average monthly salary of 15 workers in a factory is Rs. 285. If the salary of the manager is included, the average becomes Rs. 355. What is the manager's salary?

26. For what value of x, is the mode of the following data is 17?
15, 16, 17, 14, 17 16, 13, x, 17, 16, 15, 15

27. The runs scored by two teams A and B on the first 60 balls in a cricket match are given below: Represent the data of both the teams on the same graph by frequency polygons.

Number of balls	Team A	Team B
1 - 6	2	5
7 - 12	1	6
13 - 18	8	2
19 - 24	9	10
25 - 30	4	5
31 - 36	5	6
37 - 42	6	3
43 - 48	10	4
49 - 54	6	8
55 - 60	2	10

28. A random survey of the number of children of various age groups playing in a park was found as follows: Draw a histogram to represent the data above.

Age(in years)	Number of children
1 – 2	5
2 – 3	3
3 – 5	6
5 – 7	12
7 – 10	9
10 – 15	10
15 – 17	4

29. Calculate mean (by using assume mean method), median and mode.

Income	50	150	250	350	450	550	650	750
No. of persons	4	8	9	10	7	5	4	3

30. The mean of the following distribution is 107. Find the value of f_1 and f_2.

x	15	45	75	105	135	165	195	**Total**
f	2	3	f_1	10	3	f_2	2	30

31. Find the median of the distribution obtained in question no.2.

32. Find the median of first sixteen odd numbers.

33. Find the median of first ten prime numbers.

34. A school has two sections. The mean mark of one section of size 40 is 60 and mean mark of other section of size 60 is 80. Find the combined mean of all the students of the school.

35. The median of the following observations arranged in ascending order 8, 9, 12, 18, (x + 2), (x + 4), 30, 31, 34, 39 is 24. Find x.

36. The mean weight of 180 students in a school is 50kg. The mean weight of boys is 60kg while that of the girls is 45kg. Find the number of the boys and girls in the school.

37. Draw histogram and frequency polygon for the following distribution:

C. I.	0 – 50	50 – 100	100 – 150	150 – 200	200 – 250	250 – 300
F	4	8	16	13	6	3

38. Calculate mean by step deviation method:

Marks	5.5	15.5	25.5	35.5	45.5	55.5
No. of Students	3	16	26	31	16	8

39. The mean of the following distribution is 15. Find the value of a.

C. I.	5	10	15	20	25
Freq	6	a	6	10	5

40. Calculate mean by step deviation method:

Marks	15	25	35	45	55
No. of Students	20	24	40	36	20

41. The mean of the following distribution is 50. Find the value of p.

C. I.	10	30	50	70	90
Freq	17	p	32	24	19

42. Find the missing frequencies from the frequency distribution if the mean is 472 for 100 workers

Income	250	350	450	550	650	750	850
No. of workers	5	x	y	16	9	6	4

43. In a school 90 boys and 30 girls appeared in a public examination. The mean marks of boys was found to be 45% whereas the mean marks of girls was 70%. Determine the average marks % of the school.

44. The marks secured by 15 students are 70, 55, 95, 62, 82, 65, 60, 68, 75, 58, 64, 85, 80, 90, 51. Find the median marks.

45. Calculate mean (by using short cut method), median and mode.

Marks	25	35	45	55	65	75	85	95
No. of Students	5	12	6	20	18	10	16	3

46. The mean of the following distribution is 112.2 for the sum of observation 100. Find the value of x and y.

C. I.	60	80	100	120	140	160
Freq	18	X	13	27	Y	22

47. The median of the following observations arranged in ascending order 8, 9, 12, 18, (x + 2), (x + 4), 30, 31, 34, 39 is 24. Find x.

48. If the mean of 2x + 3, 3x + 4, x + 7, x – 3, 4x – 7 is 14. Find the value of x.

49. The mean of 8 numbers is 15. If each number if multiplied by 2, what will be the new mean?

50. Find the mean (by using assume mean method), median and mode of the following distribution:

x	15	25	35	45	55	65
f	90	50	60	80	50	30

51. Find the mean (by using step deviation method) ,median and mode of the given data:

x	6	10	14	18	22	26	30
f	2	4	7	12	8	4	3

52. Draw histogram and frequency polygon for the following data:

Marks	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of students	10	12	13	11	9

53. The mean of 25 observations is 36. If the mean of the first 13 observations is 32 and that of the last 13 observations is 39, find the 13^{th} observation.

54. Find mean (by using assume mean method), median and mode of the following table:

Salaries (in Rs.)	1500	2000	2500	3000	3500	4000	4500	5000
No. of workers	16	12	10	8	6	4	3	1

55. Find the mean (by using step deviation method), median and mode of the following distribution:

x	24.5	34.5	44.5	54.5	64.5	74.5	84.5	94.5
f	5	12	15	20	18	10	6	4

56. For the following data, draw a histogram and a frequency polygon.

Marks	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	5	12	6	20	18	10	16	3

57. Given below are the ages of 25 students of class IX in a school.
Prepare a discrete frequency distribution table.

15 16 16 17 17 16 15 15 16 16 17 15 16
16 14 16 15 14 15 16 16 15 14 14 15

58. Find the median of the following data: 33, 31, 48, 45, 41, 92, 78, 51, and 61. If 92 is replaced by 29, what will be the new median?

59. Following are the marks of a group of students in a test of reading ability test:

Marks:	50 – 52	47 – 49	44 – 46	41 – 43	38 – 40	35 – 37	32 – 34	**Total**
No. of students	4	10	15	18	20	12	13	92

Construct a histogram and frequency polygon for the above data.

60. For the following data, draw a histogram and a frequency polygon

x	0 – 10	10 – 20	20 – 30	30 – 50	50 – 60	60 – 80	80 – 90	90 –100
f	5	12	15	20	18	10	6	4