8

TERM-1

SAMPLE PAPER

SOLVED

MATHEMATICS

(BASIC)

Time Allowed: 90 Minutes *Maximum Marks: 40*

General Instructions: Same instructions as given in the Sample Paper 1.

SECTION - A **16 marks**

(Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.)

1. Calculate the value of HCF (8, 9, 25) × LCM (8, 9, 25).

(a) 500 (b) 1800

(c) 200 (d) 2500

2. The dependent pair of linear equations is always?

(a) Inconsistent (b) Parallel

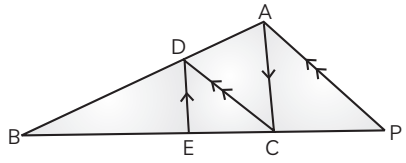
(c) Straight (d) Consistent

3. Find the value of k, if the lines given by $4x + 5ky = 10$ and $3x + y + 1 = 0$ are parallel.

(a) 7 (b) $\frac{3}{8}$

(c) $\frac{4}{15}$ (d) –1

4. In the figure below, DE || AC and DC || AP. Find $\frac{BE}{EC}$, such that BC = 4 cm and BP = 6 cm.



(a) 1 : 1 (b) 1 : 2

(c) 2 : 1 (d) 1 : 3

5. Calculate the least number which when divided by 15, leaves a remainder of 5, when divided by 25, leaves a remainder of 15 and when divided by 35, leaves a remainder of 25.

(a) 515 (b) 550

(c) 530 (d) 600

6. Consider a $\triangle ABC$, where DE || BC. If DE = $\frac{2}{3}$ BC and area of $\triangle ABC$ = 81 cm^2, then the area of $\triangle DAE$ is :

(a) 24 cm^2 (b) 16 cm^2

(c) 36 cm^2 (d) 32 cm^2

7. Find the value of (x, y), if centroid of the triangle with coordinates $(x, 0)$, $(0, y)$ and (6, 3) is (3, 4).

(a) (3, 0) (b) (6, 6)

(c) (3, 9) (d) (–6, 8)

8. Which type of lines are represented by the pair of linear equations $4x + 3y - 1 = 5$ and $12x + 9y = 15$.

(a) Coincident (b) Intersecting

(c) Parallel (d) both (a) and (c)

9. Ramesh draws a card randomly from a deck of 52 cards. The probability that this card bears an even number in black is:

(a) $\frac{1}{13}$ (b) $\frac{1}{52}$

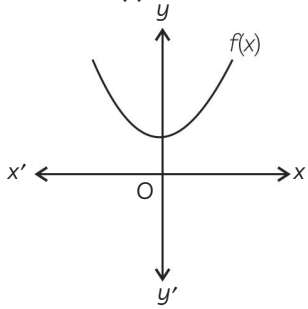
(c) $\frac{2}{13}$ (d) $\frac{5}{26}$

10. Evaluate λ, if three points (0, 0), $(3, \sqrt{3})$ and (3, λ) form an equilateral triangle.

(a) –4 (b) 2

(c) –3 (d) $\pm\sqrt{3}$

11. For the graph of $y = f(x)$ shown below, how many zeroes of $f(x)$ are there?



(a) 0 (b) 1

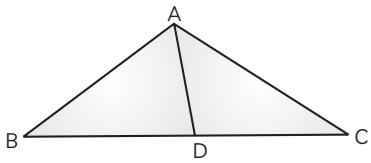
(c) 2 (d) 3

12. What is the value of x, if the probability of guessing the correct answer to a certain test question is $\frac{x}{12}$ and the probability of not guessing the correct answer to this question is $\frac{2}{3}$?

(a) 4 (b) 6

(c) 5 (d) 3

13. Find the value of ∠BAD in ΔABC, if $\frac{AB}{AC} = \frac{BD}{DC}$, ∠B = 70° and ∠C = 50°.



(a) 30° (b) 45°

(c) 60° (d) 75°

14. If corresponding angles of two triangles are equal, then two triangles are called ..... .

(a) congruent (b) similar

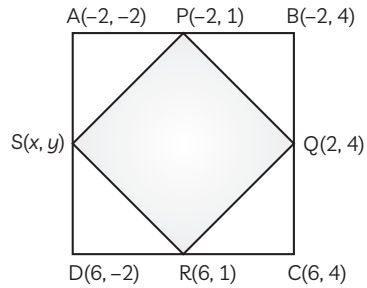
(c) equiangular (d) equal

15. Evaluate the least number which is divisible by all the numbers from 1 to 10 (both inclusive).

(a) 2500 (b) 2550

(c) 2520 (d) 3750

16. Ramlila programme is organised every year in Gokuldham society. But due to pandal set-up lot of traffic chas is generally created. In order to avoid traffic on the road which took place during Ramlila, the welfare society of decided to construct a rectangular community hall ABCD in the society. To enter the hall, there is a provision of four gates P, Q, R and S at the centre of each sides.



Find the coordinates of S, if S is the mid-point of AD.

(a) (–1, 1) (b) (1, –1)

(c) (–2, 2) (d) (2, –2)

17. What is the probability of getting different numbers on two dice, if two dice are thrown at the same time?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$

(c) $\frac{5}{6}$ (d) $\frac{1}{4}$

18. What are the coordinates of the point C, such that B $\left(\frac{1}{2}, 6\right)$ divides the line segment joining the points A(3, 5) and C in the ratio of 1 : 3?

(a) (0, 0) (b) (7, 9)

(c) (7, –9) (d) (–7, 9)

19. In a ΔABC, right angled at B, what is the value of 2 sin A cot A if tan A = $\sqrt{3}$.

(a) $\frac{1}{\sqrt{2}}$ (b) 1

(c) –1 (d) $\frac{\sqrt{3}}{2}$

20. Find the decimal expansion of the rational number $\frac{14587}{1250}$.

(a) 11.6696 (b) 12.6182

(c) 9.3120 (d) 10.717

SECTION - B

16 marks

(Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.)

21. $\sqrt{7}$ is *a*:

(a) Rational No. (b) Irrational No.

(c) Whole number (d) Integer

22. Find the value of '*p*' for which the following pair of linear equations have infinitely many solutions ?

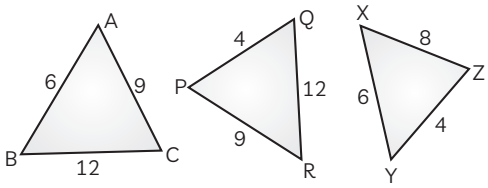
$(p - 3)x + 3y = p$, $px + py = 12$

(a) –6 (b) 0

(c) 6 (d) 12

23. In the given figure (not drawn to scale) three trianges are shown.

Which of the two triangles are similar?



(a) $\Delta ABC \sim \Delta XYZ$ (b) $\Delta PQR \sim \Delta XYZ$

(c) $\Delta ABC \sim \Delta YZX$ (d) $\Delta QPR \sim \Delta BCA$

24. In the given figure P(5, 3) and Q(3, *y*) are the points of trisection of line segment joining A(7, –2) and B(1, –5) then what is the value of *y*?

(a) –4 (b) 4

(c) –3 (d) 5

25. What is the value of *k*, in the expression, $\sec^2\theta\,(1 + \sin\theta)(1 - \sin\theta) = k$.

(a) $\frac{1}{5}$ (b) 7

(c) 1 (d) 12

26. Calculate the value of $(a + b)$, if $y = a + \frac{b}{x}$, where *a*, *b* are real numbers and $y = 1$ when $x = -1$, $y = 5$ when $x = -5$.

(a) 9 (b) 11

(c) 15 (d) 7

27. What is the value of θ $(0° < \theta \leq 90°)$, if $2\cos^2\theta = \frac{1}{2}$?

(a) 30° (b) 45°

(c) 60° (d) 75°

28. What is the number of bad eggs in a lot of 400, if the probability of getting a bad egg is 0.035.

(a) 14 (b) 21

(c) 28 (d) 7

29. In group of three friends, the probability of two friends not having the same birthday is 0.992. Then, what is the probability that the two students have the same birthday.

(a) 0.001 (b) 0.008

(c) 0.007 (d) 0.006

30. A square and a rhombus are always :

(a) similar but not congruent

(b) similar

(c) congruent

(d) neither similar nor congruent

31. Find the value of '*n*' if $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and LCM $(a, b, c) = 2^3 \times 3^2 \times 5$.

(a) 1 (b) 2

(c) 3 (d) 4

32. *Rahul and Rohit are 10th standard students. Both of them have certain number of fruits with them. Rahul says to Rohit "If you give me your fruits, I will have twice the number of fruits left with you." Rohit replies that "If you give me 10 of your fruits, I will have the same number of fruits as left with you."*

Signify the number of fruits that Rahul and Rohit has by 'x' and 'y' respectively.

What are the number of fruits that Rahul had?

(a) 50 (b) 60

(c) 55 (d) 70

33. The shadow of a 5m long stick is 2m long. Then at the same time, what is the shadow of a 12.5 high tree?

(a) 7.5m (b) 6m

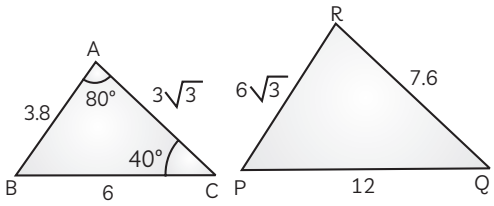
(c) 6.5m (d) 5m

34. Find the length of diagonals of a rectangle AOBC whose three vertices are A(0, 3), O(0, 0) and B(5, 0).

(a) $\sqrt{23}$ units (b) 5 units

(c) $\sqrt{21}$ units (d) $\sqrt{34}$ units

35. What is measure of ∠P, in the given figure?



(a) 70° (b) 60°
(c) 80° (d) 40°

36. Evaluate for what value of k the system of equations $2x - y = 5$ and $6x + ky = 15$ has infinitely many solutions.

(a) 8 (b) –3
(c) 3 (d) 6

37. Evaluate the distance between the points ($a \sin \alpha$, $-b \cos \alpha$) and ($-a \cos \alpha$, $b \sin \alpha$).

(a) 1
(b) $\sqrt{a^2 + b^2}$
(c) $2\sqrt{a^2 + b^2}$
(d) $\sqrt{a^2 + b^2}$ (sin α + cos α)

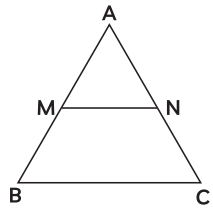
38. If tan (3x + 30°) = 1, then value of x = ?

(a) 10° (b) 25°
(c) 5° (d) 30°

39. What are the zeroes of the polynomial $2x^2 + 14x + 20$?

(a) –5, –2 (b) 5, 2
(c) –3, –2 (d) 3, 2

40. In the figure, MN || BC and AM :: MB = $\frac{1}{2}$. Then, $\frac{ar\,(\Delta AMN)}{ar\,(\Delta ABC)}$ = ?



(a) 9 : 1 (b) 1 : 9
(c) 2 : 3 (d) 3 : 2

SECTION - C

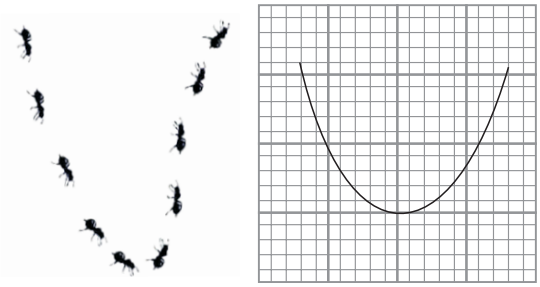
8 marks

(Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.)

Q 41 to Q 45 Based on Case Study–1:

Case Study–1:

Ants moves in a groups. Their group is called an army, as they follow a definite pattern. Sulekha observed the pattern in movement of the ants on the floor. She traced the path moved by the ants on the floor. This is shown as below.



41. What is the shape formed by the path ?

(a) Spiral (b) Parabola
(c) Oval (d) Ellipse

42. If the path traced by the ants is represented by $x^2 + 2x - 3$, then its zeroes are:

(a) 3, –1 (b) –2, 3
(c) –3, 1 (d) 2, –3

43. What is the number of zeroes of the polynomial represented by the path?

(a) at least two (b) less than two
(c) atmost two (d) one

44. What is the polynomial, if the sum and product of zeroes of the polynomial representing the path are 6 and – 16?

(a) $x^2 + 6x$ (b) $x^2 - 6x - 16$
(c) $x^2 - 6x + 16$ (d) $x^2 - 10x + 96$

45. What is the number of zeroes of the polynomial $f(x) = x^2 - 8$?

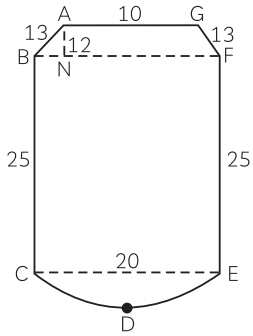
(a) 3 (b) 2
(c) 1 (d) 0

Q 46 to Q 50 Based on Case Study–2:

Case Study–2:

Thermos Housewares Co. Ltd is one of the leading brands in the field of vacuum flask. They are producing a new high-quality heat preservation flask series and the below figure shows the cross – section of the interior part of a new concept thermos flask.

The top part is a trapezium, the middle part is a rectangle and the bottom part is a semi-circle



The dimensions of various parts are:

CE = 20 cm, BC = 25 cm,

AB = GF = 13 cm,

AG = 10 cm and AN = 12 cm

46. **The perimeter of the trapezium part of the cross section, is**

(a) 36 cm **(b) 56 cm**

(c) 30 cm **(d) 46 cm**

47. **The area of the semi- circular part of the cross section, is**

(a) π sq cm **(b) 10 π sq cm**

(c) 50 π sq cm **(d) 100 π sq cm**

48. **The perimeter of the rectangular part of the cross section, is**

(a) 90 cm **(b) 70 cm**

(c) 50 cm **(d) 40 cm**

49. **The perimeter of the cross section, is**

(a) 83 cm **(b) 86 cm**

(c) 117.4 cm **(d) 130.4 cm**

50. **The area of the cross section, is**

(a) 873 sq cm **(b) 738 sq cm**

(c) 783 sq cm **(d) 837 sq cm**

SOLUTION

SAMPLE PAPER - 8

SECTION - A

1. *(b) 1800*

Explanation:

We have,

$8 = 2^3, 9 = 3^2, 25 = 5^2$

$\therefore$ HCF (8, 9, 25) = 1

and LCM (8, 9, 25) $= 2^3 \times 3^2 \times 5^2 = 1800$

$\therefore$ HCF (8, 9, 25) × LCM (8, 9, 25)

$= 1 \times 1800 = 1800$

2. *(d) Consistent*

3. *(c)* $\frac{4}{15}$

Explanation: Since the given lines are parallel.

$\therefore \frac{4}{3} = \frac{5k}{1} \neq \frac{-10}{1}$ *i.e.*, $k = \frac{4}{15}$.

4. *(c) 2 : 1*

Explanation: In ΔBAC, DE || AC.

$\therefore \quad \frac{BE}{EC} = \frac{BD}{DA}$ ....(i)

[By basic proportionality theorem]

Also, in ΔBAP DC || AP.

$\therefore \quad \frac{BC}{CP} = \frac{BD}{DA}$ ....(ii)

From Eqs. (i) and (ii), we get

$\frac{BE}{EC} = \frac{BC}{CP}$

$\Rightarrow \quad \frac{BE}{CE} = \frac{BC}{BP - BC}$

$\therefore \quad \frac{BE}{EC} = \frac{6}{6-4} = \frac{4}{2}$ [given]

$= \frac{2}{1} = 2 : 1$

5. *(a) 515*

Explanation: In each case, the remainder is 10 less than the divisr,

So, required number = LCM(15, 25, 35) – 10

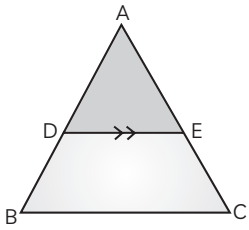
L.C.M. of 15, 25, 35 is 525.

Hence, least number = 525 – 10 = 515

6. *(c) 36 cm²*

Explanation: Here, DE = $\frac{2}{3}$ BC

And DE || BC



$\therefore$ $\Delta ADE \sim \Delta ABC$ (by AA similarity)

$\therefore$ $\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$

Also,

$$\frac{ar(\triangle ADE)}{ar(\triangle ABC)} = \frac{DE^2}{BC^2} = \left(\frac{\frac{2}{3}BC}{BC^2}\right)^2 = \frac{4}{9}$$

$\Rightarrow$ $\frac{ar(\Delta ADE)}{81} = \frac{4}{9}$

$\Rightarrow$ $ar(\Delta DAE) = 36$

7. *(c) (3, 9)*

Explanation: Since, (3, 4) is the centroid of a triangle with vertices $(x, 0)$, $(0, y)$ and (6, 3).

$\therefore$ $3 = \frac{x+0+6}{3}$ and $4 = \frac{0+y+3}{3}$

$\Rightarrow$ $x = 3$ and $y = 9$

$\therefore$ $(x, y) = (3, 9)$

8. *(c) Parallel*

Explanation:

Here, $\frac{4}{12} = \frac{3}{9} \neq \frac{6}{15}$ *i.e.*, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

$\therefore$ Given pair of equations represent parallel lines

9. *(d)* $\frac{5}{26}$

Explanation: Number of possible outcomes = 52

Number of favourable outcomes *i.e.*, card bearing an even number in black = 10

$\therefore$ Required probability = $\frac{10}{52} = \frac{5}{26}$

10. *(d)* $\pm\sqrt{3}$

Explanation: Let the given points be A(0, 0), $B(3, \sqrt{3})$ and $C(3, \lambda)$.

Since, ΔABC is an equilateral triangle,

$\therefore$ $AB = AC$

$\Rightarrow$ $\sqrt{(3-0)^2+(\sqrt{3}-0)^2} = \sqrt{(3-0)^2+(\lambda-0)^2}$

$\Rightarrow$ $9 + 3 = 9 + \lambda^2 \Rightarrow \lambda^2 = 3$

$\Rightarrow$ $\lambda = \pm\sqrt{3}$

11. *(a) 0*

Explanation: $f(x)$ has no zero, as it does not intersect x-axis at any point.

12. *(a) 4*

Explanation: We have,

P(not guessing correct answer) = $\frac{2}{3}$

$\therefore$ P(guessing correct answer)

= 1 – P(not guessing correct answer)

= $1 - \frac{2}{3} = \frac{1}{3}$

So, according to the question,

$\frac{x}{12} = \frac{1}{3} \Rightarrow x = 4$

13. *(a) 30°*

Explanation: In a triangle, the sum of all angles of a triangle is 180°.

$\angle A + \angle B + \angle C = 180°$

$\Rightarrow$ $\angle A = 180° - (70° + 50°) = 60°$

Also given, $\frac{BD}{DC} = \frac{AB}{AC}$

It means AD is the bisector of $\angle A$.

$\therefore$ $\angle A = \frac{1}{2} \times 60° = 30°$

14. *(c) equiangular*

Explanation: Their all angles are equal.

15. *(c) 2520*

Explanation: Required number = LCM of all the numbers from 1 to 10 = 2520

16. *(d) (2, –2)*

Explanation: $S(x, y)$ is mid-point of A (–2, –2) and D (6, –2)

$\Rightarrow$ $(x, y) = \left(\frac{-2+6}{2}, \frac{-2-2}{2}\right)$

$= \left(\frac{4}{2}, \frac{-4}{2}\right) = (2, -2)$

17. *(c)* $\frac{5}{6}$

Explanation: Total number of possible outcomes = 6 × 6 = 36

Number of possible outcome for getting same numbers on both dice = 6

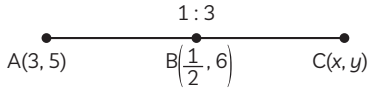
$\therefore$ P(getting same number) = $\frac{6}{36} = \frac{1}{6}$

Since, P(getting same numbers) + P(getting different numbers) = 1

$\Rightarrow$ P(getting different numbers) = $1 - \frac{1}{6} = \frac{5}{6}$

18. *(d) (–7, 9)*

Explanation:



By using section formula, we get

$$\left(\frac{1\times x+3\times 3}{4},\ \frac{1\times y+3\times 5}{4}\right)=\left(\frac{1}{2},6\right)$$

$$\Rightarrow \frac{x+9}{4}=\frac{1}{2},\ \frac{y+15}{4}=6$$

$$\Rightarrow x=-7,\ y=24-15=9$$

19. *(b) 1*

Explanation: We have, $\tan A=\sqrt{3}$

$$\Rightarrow \quad \angle A=60°$$

Now, $2\sin A\cot A=2\sin 60°\cot 60°$

$$=2\times\frac{\sqrt{3}}{2}\times\frac{1}{\sqrt{3}}=1$$

20. *(a) 11.6696*

Explanation: We have,

$$\frac{14587}{1250}=\frac{14587}{2\times 5^4}$$

$$=\frac{14587}{10\times 5^3}\times\frac{(2)^3}{(2)^3}$$

$$\frac{14587\times 8}{10\times 1000}=\frac{116696}{10000}$$

$$=11.6696$$

SECTION - B

21. *(b) Irrational number*

Explanation: If m is a natural number, which is not a perfect square, then $\sqrt{m}$ is irrational..

22. *(c) 6*

Explanation: Given pair of linear equations is $(p-3)x+3y=p$ and $px+py=12$, which has infinitely many solutions.

$$\therefore \quad \frac{p-3}{p}=\frac{3}{p}$$

and $$\frac{3}{p}=\frac{p}{12}$$

$$\Rightarrow \quad p^2-3p=3p \text{ and } 12\times 3=p^2$$

$$\Rightarrow \quad p^2-6p=0 \text{ and } p^2=36$$

$$\Rightarrow \quad p=0, 6 \text{ and } p=\pm 6$$

The common value of p is 6.

23. *(c) $\Delta ABC\sim\Delta YZX$*

Explanation: In ΔABC and ΔYZX,

$$\frac{AB}{YZ}=\frac{6}{4}=\frac{3}{2}$$

$$\frac{AC}{YX}=\frac{9}{6}=\frac{3}{2}$$

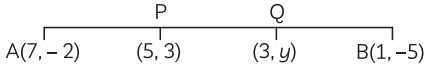
$$\frac{BC}{ZX}=\frac{12}{8}=\frac{3}{2}$$

$\therefore \Delta ABC\sim\Delta YZX$ [By SSS similarity criterion]

Caution

➥ *Take the ratio of the corresponding sides to find the two-similar triangles.*

24. *(a) – 4*



Explanation: Here, Q is the mid point of PB.

$$\therefore \quad y=\frac{-3+(-5)}{2}$$

$$=-\frac{8}{2}=-4$$

25. *(c) 1*

Explanation: We have,

$$\sec^2\theta\ (1+\sin\theta)\ (1-\sin\theta)=k$$

$$\Rightarrow \quad \sec^2\theta(1-\sin^2\theta)=k$$

$$\Rightarrow \quad \frac{1}{\cos^2\theta}\times\cos^2\theta=k\Rightarrow k=1$$

26. *(b) 11*

Explanation:

We have $y=a+\frac{b}{x}$ ..*(i)*

When $y=1$, then $x=-1$

$$\therefore \quad 1=a+\frac{b}{-1}$$

$$\Rightarrow \quad a-b=1 \quad \text{...(ii)}$$

When $y=5$, then $x=-5$

$$\therefore \quad 5=a-\frac{b}{5}$$

$$\Rightarrow \quad 5a-b=25 \quad \text{...(ii)}$$

Subtracting eq. (i) from eq. (ii, we get

$$5a-b-a+b=25-1$$

$$\Rightarrow \quad 4a=24\Rightarrow a=6$$

$$\therefore \quad b=5$$

$$\therefore \quad a+b=6+5=11$$

27. *(c) 60°*

Explanation: We have,

$$2\cos^2\theta=\frac{1}{2}$$

$\Rightarrow \quad \cos^2\theta = \frac{1}{4} \Rightarrow \cos\theta = \pm\frac{1}{2}$

$\therefore \quad \theta = 60°$

28. *(a) 14*

Explanation: $\text{P(bad egg)} = \frac{\text{Number of bad eggs}}{\text{Total number of eggs}}$

$\Rightarrow \quad 0.035 = \frac{\text{Number of bad eggs}}{400}$

$\Rightarrow$ Number. of bad eggs = 400 × 0.035 = 14

29. *(b) 0.008*

Explanation: We know, P(having same birthday) + P(not having the same birthday) = 1

$\Rightarrow$ P(having same birthday) + 0.992 = 1

$\Rightarrow$ P(having same birthday) = 1 – 0.992 = 0.008

30. *(d) neither similar nor congruent*

As in squares all sides are equal and diagonals are also equal and all angles are 90°. But in rhombus, sides are equal but diagonals are not and all angles are not 90°.

31. *(b) 2*

Explanation: *We have,*

$a = 2^3 \times 3,\ b = 2 \times 3 \times 5,\ c = 3^n \times 5$

$\therefore \quad \text{LCM}(a, b, c) = 2^3 \times 3^n \times 5$

$\Rightarrow \quad 2^3 \times 3^n \times 5 = 2^3 \times 3^2 \times 5$

$\therefore \quad n = 2$

32. *(d) 70*

Explanation: If the number of furits with Rahul and Rohit be '*x*' and '*y*'.

ATQ, $x + 10 = 2(y - 10)$

or $x - 2y = -30$ ...*(i)*

And

$x - 10 = y + 10$

or $x - y = 20$ ...*(ii)*

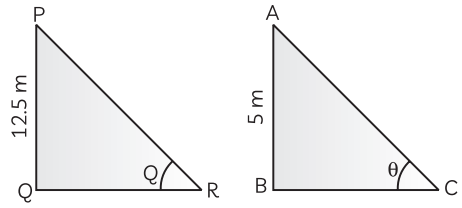
on solving (i) and (ii), we get

$y = 50$

and $x = 70$

33. *(d) 5m*

Explanation: Here, AB is a stick and PQ is a tree Angle of elevation is same at same time of the day.



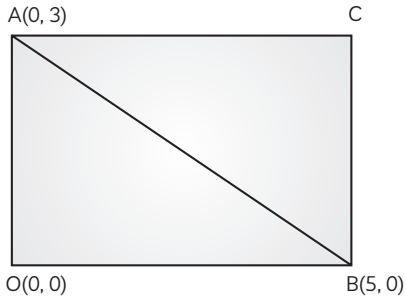
$\Delta PQR \sim \Delta ABC$

$\therefore \quad \frac{PQ}{QR} = \frac{AB}{BC} \Rightarrow \frac{12.5}{QR} = \frac{5}{2}$

$\Rightarrow \quad QR = \frac{12.5 \times 2}{5} = 5\text{m}$

34. *(d) $\sqrt{34}$ units*

Explanation: Length of diagonal = AB = $\sqrt{(5-0)^2 + (0-3)^2} = \sqrt{25+9} = \sqrt{34}$



Concept Applied

➥ *Diagonals of a rectangle are equal in length.*

35. *(d) 40°*

Explanation : In ΔABC and ΔPQR

$\frac{AB}{QR} = \frac{3.8}{7.6} = \frac{1}{2}$;

$\frac{BC}{PQ} = \frac{6}{12} = \frac{1}{2}$; and

$\frac{AC}{RP} = \frac{3\sqrt{3}}{6\sqrt{3}} = \frac{1}{2}$

$\therefore \quad \Delta ABC \sim \Delta RQP$

$\therefore \quad \angle C = \angle P$ (angles of similar triangles)

$\Rightarrow \quad \angle P = 40°$

36. *(b) –3*

Explanation: Given system of equations is:

$2x - y = 5$ and $6x + ky = 15$

For infinitely many solutions, we have

$\frac{2}{6} = -\frac{1}{k} \Rightarrow \frac{1}{3} = -\frac{1}{k}$

$\Rightarrow \quad k = -3$

37. *(d) $\sqrt{a^2+b^2}(\sin\alpha + \cos\alpha)$*

Explanation: Let the given points be A($a \sin\alpha$, $-b\cos\alpha$) and B($-a\cos\alpha$, $b\sin\alpha$).

$\therefore$ Required distance, AB

$= \sqrt{(-a\cos\alpha - a\sin\alpha)^2 + (b\sin\alpha + b\cos\alpha)^2}$

$= \sqrt{(-a)^2(\cos\alpha + \sin\alpha)^2 + b^2(\sin\alpha + \cos\alpha)^2}$

$= \sqrt{(a^2+b^2)(\sin\alpha + \cos\alpha)^2}$

$= \sqrt{a^2+b^2}(\sin\alpha + \cos\alpha)$

38. *(c) 5°*

Explanation: Here, $\tan(3x + 30°) = 1$

$\tan(3x + 30°) = \tan 45°$

$\Rightarrow 3x + 30° = 45°$

$\Rightarrow 3x = 15°$

$\Rightarrow x = 5°$

39. *(a) –5, –2*

Explanation: Here, $p(x) = 2x^2 + 14x + 20$

$\Rightarrow 2x^2 + 14x + 20 = 0$

or $x^2 + 7x + 10 = 0$

$\Rightarrow x^2 + 5x + 2x + 10 = 0$

$\Rightarrow x(x + 5) + 2(x + 5) = 0$

$\Rightarrow (x + 2)(x + 5) = 0$

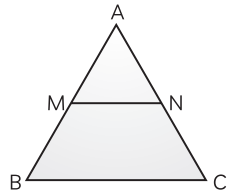
$\Rightarrow x = -5, -2$

40. *(b) 1 : 9*

Explanation: Here, MN || BC

$\therefore$ $\angle AMN = \angle ABC$

[Corresponding pair of angles]



similarly, $\angle ANM = \angle ACB$

$\therefore$ $\Delta AMN \sim \Delta ABC$ [by AA similarity]

By property of similar triangles,

$$\frac{ar(\Delta AMN)}{ar(\Delta ABC)} = \frac{AM^2}{AB^2} \quad \text{... (i)}$$

But $\frac{AM}{MB} = \frac{1}{2}$

$\therefore$ $\frac{AM}{AB} = \frac{AM}{AM+MB}$

$= \frac{1}{1+2} = \frac{1}{3}$

Put the value in (i), we get

$\therefore$ $\frac{ar(\Delta AMN)}{ar(\Delta ABC)} = \left(\frac{1}{3}\right)^2 = \frac{1}{9}$

SECTION - C

41. *(b) Parabola*

42. *(c) –3, 1*

Explanation: Given polynomial $= x^2 + 2x - 3$

$= x^2 + 3x - x - 3$

$= x(x + 3) - 1(x + 3)$

$= (x + 3)(x - 1)$

To find the zeroes,

Put $(x + 3)(x - 1) = 0$

$\Rightarrow x = -3, 1$

43. *(c) at most two*

Explanation: Parabola represents a quadratic polynomial which has atmost two zeroes.

44. *(b) $x^2 - 6x - 16$*

Explanation: A quadratic polynomial is given by x^2 – (sum of zeroes) x + product of zeroes *i.e.*, $x^2 - 6x - 16$

45. *(b) 2*

Explanation: Let $f(x) = x^2 - 8$

To find the zeroes,

Put $x^2 - 8 = 0$

$\Rightarrow x^2 = 8$

$\Rightarrow x = \pm \sqrt{8}$

$x = \pm 2\sqrt{2}$ (two zeroes)

46. *(b) 56 cm*

Explanation:

Perimeter of trapezium = AG + GF + BF + AB

= 10 + 13 + 20 + 13

= 56 cm

47. *(d) 100 π sq cm*

Explanation:

Area of semicircular portion $= \pi (10)^2$

$= 100\pi$

48. *(a) 90 cm*

Explanation: Perimeter of rectangular part

= 20 + 25 + 20 + 25

= 90 cm

49. *(c) 117.4 cm*

Explanation: The perimeter of the cross-section

= [10 + 13 + 25 + π (10) + 25 + 13] cm

=117.4 cm [Taking π = 3.14]

50. *(d) 837 sq cm*

Explanation: Area of cross-section = ar (trap ABFG) + ar (rect BCEF) + ar (semi-circle CDE)

$= \left[\frac{1}{2}(10+20)(12) + 25 \times 20 + \frac{\pi}{2}(10)^2\right]$ sq cm

= (180 + 500 + 157) sq cm

= 837 sq cm