7

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**

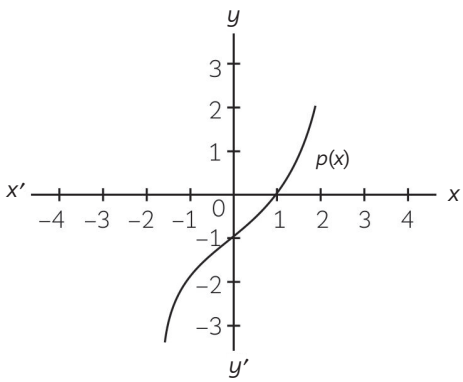
(Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.)

1. **What is the sum of exponents of prime factors in the prime factorisation of 250.**

(a) 4 **(b) 6**

(c) 8 **(d) 3**

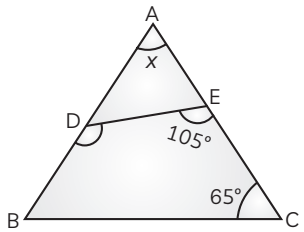
2. **Find the number of zeroes, for the polynomial $p(x)$ shown in the graph below:**



(a) 0 **(b) 1**

(c) 2 **(d) 3**

3. **What is the value of x in the given figure, if $\Delta ADE \sim \Delta ACB$, $\angle DEC = 105°$ and $\angle ECB = 65°$?**



(a) 45° **(b) 60°**

(c) 13° **(d) 40°**

4. **What is the probability of chosing a vowel from the word MATCH if a letter is chosen randomly from it?**

(a) $\frac{2}{5}$ **(b) $\frac{1}{5}$**

(c) $\frac{3}{5}$ **(d) $\frac{4}{5}$**

5. **When an event is very unlikely to happen, then its probability of occurence is closest to:**

(a) 0.1 **(b) 0.01**

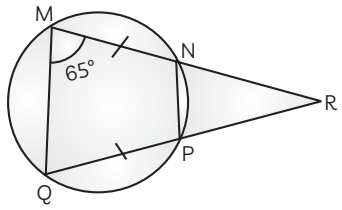
(c) 0.001 **(d) 0.0001**

6. **Calculate the value of 'k', if $x = k$ is a solution of the quadratic polynomial $x^2 + 4x + 3$.**

(a) 1 **(b) –1**

(c) 3 **(d) –4**

7. As shown in the figure, MN = QP and on producing MN and QP, they intersect at R. If MQ || NP and $\angle NMQ = 65°$, calculate $\angle R$.



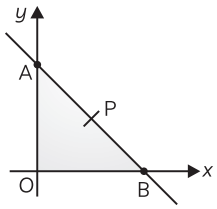
(a) 30° (b) 25°
(c) 35° (d) 50°

8. Evaluate the least number which when divided by the numbers 18, 24, 30 and 42 leaves a remainder of 1.
(a) 4221 (b) 2521
(c) 3862 (d) 1221

9. What is the value of $\frac{\sin 45°}{\sec 30° + \operatorname{cosec} 30°}$?

(a) $(\sqrt{3} - 1)$ (b) $\frac{\sqrt{3}(\sqrt{3} - 1)}{4\sqrt{2}}$
(c) $4\sqrt{2}$ (d) $\sqrt{3}(\sqrt{3} - 1)$

10. In the figure P(2, 3) is the mid-point of the line segment AB. What are the co-ordinates of A and B respectively:



(a) (4, 0) and (6, 0) (b) (0, 4) and (6, 0)
(c) (0, 4) and (0 6) (d) (0 –4) and (–6, 0)

11. From a well-shuffled deck of 52 playing cards, three cards ace, jack and queen of hearts are removed. One card is selected from the remaining cards. What is the probability of getting a card of hearts?
(a) $\frac{10}{49}$ (b) $\frac{5}{49}$
(c) $\frac{8}{49}$ (d) $\frac{13}{49}$

12. If the point (5, 0), (0, – 2) and (3, 6) lie on the graph of a polynomial. Then, which of the following is a zero of the polynomial?
(a) 5 (b) 6
(c) –2 (d) not defined

13. Evaluate measure of angle A, in ΔABC which is right-angled at C and AC = 4 cm and AB = 8 cm.
(a) 30°
(b) 45°
(c) 60°
(d) Cannot be determined

14. Evaluate the area covered by hour hand in 1 hour, where the length of hour hand of a clock is 7 cm.
(a) 9 cm^2 (b) 11 cm^2
(c) 13 cm^2 (d) 15 cm^2

15. The two zeroes of the polynomial $p(x) = 4x^2 - 12x + 9$ are:
(a) $\frac{3}{2}, \frac{3}{2}$ (b) $\frac{3}{2}, \frac{1}{4}$
(c) $\frac{1}{4}, \frac{1}{2}$ (d) $\frac{3}{2}, \frac{-3}{2}$

16. After how many places will the decimal expansion of $\frac{189}{125}$ terminates:
(a) 1 place (b) 2 place
(c) 3 place (d) 4 place

17. What will be the maximum number of students among whom 1001 pens and 910 pencils can be distributed provided that each student gets the same number of pens and pencils?
(a) 70 (b) 93
(c) 91 (d) 82

18. What is the value of $\beta - \alpha$, if $\sin \alpha = \frac{\sqrt{3}}{2}$ and $\cos \beta = 0$.
(a) 0° (b) 30°
(c) 45° (d) 60°

19. What is the relation between x and y, if the point P(x, y) is equidistant from the points A(7, 0) and B(0, 5)?
(a) $x + 2y = 9$ (b) $7x - 5y = 12$
(c) $5x + 2y = 15$ (d) $3x - 2y = 7$

20. Evaluate $0.\overline{68} + 0.\overline{73}$.
(a) $1.\overline{31}$ (b) $1.\overline{42}$
(c) $1.\overline{21}$ (d) $1.0\overline{1}$

SECTION - B

16 marks

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

21. A pair of linear equations is said to be inconsistent if it has:

(a) at least one solution

(b) no solution

(c) infinitely many solutions

(d) unique solution

22. 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

23. If in triangles ABC and PQR, $\frac{AB}{PQ}=\frac{BC}{RP}$, then write the equality of angles of the two triangles such that two triangles are similar.

(a) $\angle A = \angle Q$ (b) $\angle B = \angle P$

(c) $\angle C = \angle Q$ (d) $\angle B = \angle Q$

24. Evaluate the simplified value of $(1 + \cot^2 \theta)(1 - \cos \theta)(1 + \cos \theta)$.

(a) 1 (b) –1

(c) $\cot \theta$ (d) $\sec^2 \theta$

25. Evaluate the radius of a circle, whose circumference is numerically equal to four times the area of the circle.

(a) 0.5 cm (b) 4 cm

(c) 7 cm (d) $\frac{22}{7}$ cm

26. *Sakshi and Rashi wants to play the ludo. But beings kids, they are fighting with each other as who will start the game. Both of them want to throw the dice first. They found two coins and decided to toss them simultaneously to know who will start the game.*

Sakshi says, 'If I get atleast one head, I will win and start the game. The probability that Sakshi will start the game is:

(a) 1 (b) $\frac{3}{4}$

(c) $\frac{1}{4}$ (d) $\frac{1}{2}$

27. An equilateral ΔABC is of length $2a$ units. Then the length of each of its altitude is:

(a) $\sqrt{3}$ a units (b) $\frac{\sqrt{3}}{2}$ a units

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

28. A box contains 8 red pencils and some blue pencils. If the probability of drawing a blue pencil is three times of a red pencil, then the number of blue pencils in the bag are:

(a) 36 (b) 24

(c) 18 (d) 12

29. What is the point of intersection of the lines $x - 3 = 0$ and $y - 5 = 0$?

(a) (–3, 5) (b) (–3, 5)

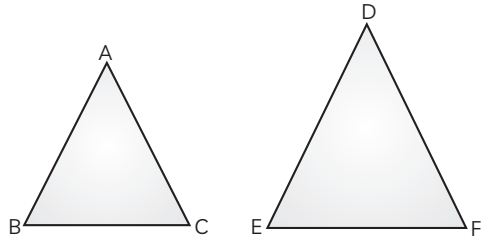
(c) (3, 5) (d) (3, –5)

30. Consider the two numbers whose sum is 135 and their HCF is 27. If their LCM is 162, then what will be the larger number?

(a) 81 (b) 78

(c) 57 (d) 54

31. Given two triangles ABC and DEF. If $\Delta ABC \sim \Delta DEF$, 2AB = DE and BC = 8 cm, then find the length of EF.



(a) 10 cm (b) 12 cm

(c) 8 cm (d) 16 cm

32. What is the value of y, if $\sin x + \cos y = 1$; $x = 30°$ and y is an acute angle?

(a) 30° (b) 45°

(c) 60° (d) 90°

33. Find the value of $\frac{1}{\alpha}+\frac{1}{\beta}$, if α and β are the zeroes of the polynomial $x^2 + x + 1$.

(a) 1 (b) 0

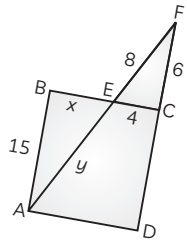
(c) –1 (d) 2

34. The region enclosed by an arc and a chord of a circle is called ..... of the circle.

(a) segment (b) quadrant

(c) sector (d) area

35. *In the given figure, Here, ABCD is a parallellogram in which DC is extended to F such that AF intersects BC at E.*



Perimeter of ΔABE =

(a) 35 cm **(b) 36 cm**
(c) 40 cm **(d) 45 cm**

36. **Evaluate the area of the largest circle that can be inscribed inside a rectangle of sides 7 cm and 3.5 cm.**

(a) $\frac{12}{7}cm^2$ **(b)** $\frac{17}{7}cm^2$
(c) $\frac{77}{8}cm^2$ **(d)** $\frac{22}{7}cm^2$

37. **If $x = 2$ is a zero of polynomial $ax^2 - bx + 2$, then what is the relation between a and b?**

(a) $2a - b + 1 = 0$
(b) $a + b + 1 = 0$
(c) $a - b + 1 = 0$
(d) $7a - 5b + 1 = 0$

38. **What is the length of each side of a rhombus whose diagonals are of lengths 10 cm and 24 cm?**

(a) 34 cm **(b) 26 cm**
(c) 25 cm **(d) 13 cm**

39. **What is the length of side AC in DABC, which is right angled at B if BC = 5 cm and ∠BAC = 30°?**

(a) 5 cm **(b) 15 cm**
(c) 10 cm **(d) 7 cm**

40. **A quadratic polynomial with zeroes –2 and 3, is :**

(a) $3x^2 - 2x + 6$ **(b)** $2x^2 + 3x - 6$
(c) $x^2 - 2x + 6$ **(d)** $x^2 - x - 6$

SECTION - C

8 marks

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

Q. 41-45 are based on Case Study–1.

Case Study–1:

Due to ongoing COVID-19 crises, Surbhi Medical store has started stocking up and sell masks of decent quality as sourced from a disposable medical device manufacturer. The owner of Surbhi Medical store is selling two types of masks currently - A and B. The cost of one type A mask is ₹ 10 and of one type B mask is ₹ 12. In the month of April, 2020, the store sold 100 masks for total sales of ₹ 1082.

Due to great demand and short supply, the store has increased the price of each type by ₹ 1 from May 1, 2020 . In the month of May, 2020, the store sold 250 masks for total sales of ₹ 2920.

41. **How many masks of each type were sold in the month of April?**

(a) 46 masks of type A, and 54 masks of type B
(b) 54 masks of type A, and 46 masks of type B
(c) 41 masks of type A, and 59 masks of type B
(d) 59 masks of type A, and 41 masks of type B

42. **If the store had sold 50 masks of each type, what would be its sales in month of April?**

(a) ₹ 550 **(b) ₹ 560**
(c) ₹ 1050 **(d) ₹ 1100**

43. **How many masks of each type were sold in the month of May?**

(a) 120 masks of type A, and 130 masks of type B

(b) 130 masks of type A, and 120 masks of type B
(c) 155 masks of type A, and 95 masks of type B
(d) 165 masks of type A, and 85 masks of type B

44. **If the store had sold 125 masks of each type, what would be its sale in month of May?**
(a) ₹ 3000 (b) ₹ 3052
(c) ₹ 2941 (d) ₹ 2938

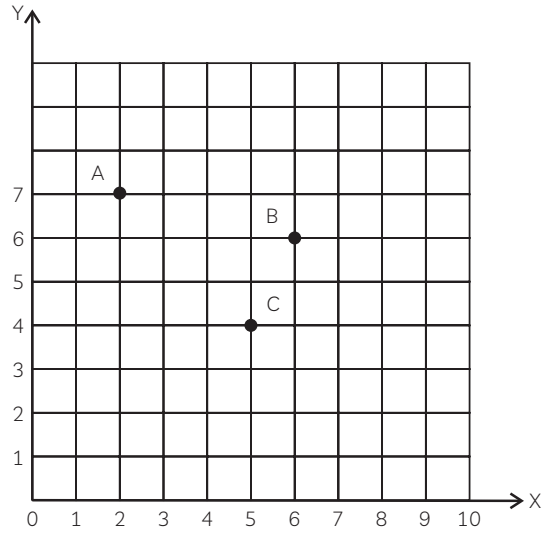
45. **What percent of masks of each type sale was increased in the month of May, compared with the sale of month April?**
(a) 200% in type A ; and 100% in type B
(b) 180% in type A and 110% in type B
(c) 150% in type A and 120% in type B
(d) 110% in type A and 180% in type B

Q. 46-50 are based on Case Study–2.

Case Study–2:

Resident Welfare Association (RWA) of a M2K Society in Azadpur have put up three electric poles A, B and C in a society's common park near Tower A. Despite these three poles, some parts of the park are still in dark.

So, RWA decides to have one more electric pole D in the park.



46. **(A) The position of the pole C is:**
(a) (5, 4) (b) (2, 7)
(c) (8, 9) (d) (9, 8)

47. **(B) The distance of the pole B form the corner O of the park is:**
(a) $\sqrt{53}$ units (b) $\sqrt{41}$ units
(c) $\sqrt{72}$ units (d) $\sqrt{145}$ units

48. **(C) The position of the fourth pole D so that four points A, B, C and D form a parallelogram is:**
(a) (1, 4) (b) (1, 5)
(c) (2, 3) (d) (5, 1)

49. **(D) The distance between poles A and C is:**
(a) $\sqrt{18}$ units (b) $\sqrt{17}$ units
(c) $\sqrt{5}$ units (d) $\sqrt{34}$ units

50. **(E) The distance between poles B and D is:**
(a) $\sqrt{24}$ units (b) $\sqrt{17}$ units
(c) $\sqrt{5}$ units (d) $\sqrt{26}$ units

SOLUTION

SAMPLE PAPER - 7

SECTION - A

1. *(a) 4*

Explanation: Prime factorisation of 250 is

$250 = 2 \times 5 \times 5 \times 5$

$= 2^1 \times 5^3$

$\therefore$ Sum of exponents $= 1 + 3 = 4$

2. *(b) 1*

Explanation: It is clear that the graph of $p(x)$ cut the x-axis at only one point. Hence, the number of zeroes of $p(x)$ is 1.

Caution

➥ *The point where graph cuts the x-axis are the zeroes of the polynomial.*

3. *(d) 40°*

Explanation:

$\because$ $\Delta ADE \sim \Delta ACB$ (Given)

$\therefore$ $\angle ACB = \angle ADE = 65°$

Also, $\angle AED = \angle ABC = 180° - 105° = 75° = \angle ABC$

In ΔADE,

$\angle ADE + \angle AED + \angle DAE = 180°$

$\Rightarrow$ $65° + 75° + \angle DAE = 180°$

$\Rightarrow$ $\angle DAE = 180° - 140° = 40°$

4. *(b)* $\frac{1}{5}$

Explanation: Total number of letters = 5

$\therefore$ Total possible outcomes = 5

Number of vowels in the given word, is A *i.e.*,

= 1 (Favourable case)

$\therefore$ Probability of selecting a vowel

$$= \frac{\text{Number of favourable cases}}{\text{Total possible outcomes}}$$

$$= \frac{1}{5}$$

5. *(d) 0.0001*

Explanation: Event is very unlikely to happen so its probability will be more closer to zero.

6. *(b) –1*

Explanation : Since, $x = k$ is a solution of given polynomial.

$\therefore$ $k^2 + 4k + 3 = 0$

$\Rightarrow$ $k^2 + 3k + k + 3 = 0$

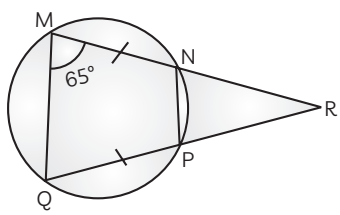
$\Rightarrow$ $k(k + 3) + 1(k + 3) = 0$

$\Rightarrow$ $(k + 3)(k + 1) = 0$

$\Rightarrow$ $k = -1$ or -3

7. *(d) 50°*

Explanation: In figure,



NP || MQ

$\therefore$ $\angle RNP = \angle M = 65°$

(Corresponding angles)

Also, $\frac{RN}{NM} = \frac{RP}{PQ}$ (By BPT)

$\Rightarrow$ $RN = RP$ $[\because MN = PQ]$

$\therefore$ $\angle RNP = \angle RPN = 65°$

In ΔRNP,

$\angle R + \angle RNP + \angle RPN = 180°$

$\angle R + 65° + 65° = 180°$

$\angle R + 130° = 180°$

$\angle R = 50°$

8. *(b) 2521*

Explanation:

We have, $18 = 2 \times 3^2$;

$24 = 2^3 \times 3$;

$30 = 2 \times 3 \times 5$

and $42 = 2 \times 3 \times 7$

LCM(18, 24, 30, 42) $= 2^3 \times 3^2 \times 5 \times 7 = 2520$

So, required least number is 2520 + 1 = 2521

9. *(b)* $\frac{\sqrt{3}(\sqrt{3}-1)}{4\sqrt{2}}$

Explanation: $\frac{\sin 45°}{\sec 30° + \operatorname{cosec} 30°} = \frac{\frac{1}{\sqrt{2}}}{\frac{2}{\sqrt{3}} + 2}$

$$= \frac{\sqrt{3}}{\sqrt{2}(2 + 2\sqrt{3})}$$

$$= \frac{\sqrt{3}}{2\sqrt{2}(1+\sqrt{3})} \times \frac{(\sqrt{3}-1)}{(\sqrt{3}-1)}$$

$$= \frac{\sqrt{3}(\sqrt{3}-1)}{2\sqrt{2}\left((\sqrt{3})^2 - 1\right)}$$

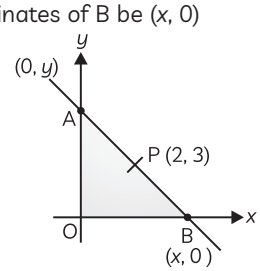
$$= \frac{\sqrt{3}(\sqrt{3}-1)}{2\sqrt{2}(3-1)}$$

$$= \frac{\sqrt{3}(\sqrt{3}-1)}{2\sqrt{2} \times 2}$$

$$= \frac{\sqrt{3}(\sqrt{3}-1)}{4\sqrt{2}}$$

10. *(b) 2521*

Explanation: Let the coordinates of A be $(0, y)$ and coordinates of B be $(x, 0)$



Here, coordinates of P(2, 3)

$\therefore$ co-ordinates of P(2, 3) $= \left(\frac{x+0}{2}, \frac{y+0}{2}\right)$

$\therefore \quad \frac{x}{2} = 2$ and $\frac{y}{2} = 3$

$\Rightarrow \quad x = 4$ and $y = 6$

$\therefore$ co-ordinates of A(0, 4) and B(6,0)

11. *(a)* $\frac{10}{49}$

Explanation: Number of card left = 52 – 3 = 49

Number of heart cards left = 13 – 3 = 10

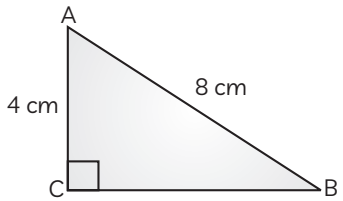
$\therefore$ Required probability = $\frac{10}{49}$

12. *(a) 5*

Explanation: As in point (5, 0), y-coordinate is zero. Therefore, 5 is the zero of the polynomial.

13. *(c) 60°*

Explanation: In ΔABC,



$$\cos A = \frac{AC}{AB} = \frac{4}{8} = \frac{1}{2}$$
$$= \cos 60°$$

$\Rightarrow \quad \angle A = 60°$

14. *(c) 13 cm²*

Explanation: Angle described by hour hand in 1 hour = $\frac{360°}{12} = 30°$

$\therefore$ Area swept = $\frac{\theta}{360°} \times \pi r^2$

$$= \frac{30°}{360°} \times \pi \times (7)^2 \text{ cm}^2 = 12.83 \text{ cm}^2$$

15. *(b)* $\frac{3}{2}, \frac{3}{2}$

Explanation: Here, $p(x) = 4x^2 - 12x + 9$ on splitting the middle term, we get

$$p(x) = 4x^2 - 6x - 6x + 9$$
$$= 2x(2x - 3) - (2x - 3)$$
$$= (2x - 3)(2x - 3)$$

For finding zeroes, put $p(x) = 0$

$$p(x) = 0$$
$\Rightarrow \quad (2x - 3)(2x - 3) = 0$

$\Rightarrow \quad x = \frac{3}{2}, \frac{3}{2}$

16. *(c) 3 place*

Explanation: Here, 189 and 125 are co-prime numbers

$\therefore \quad \frac{189}{125} = \frac{189}{5^3}$

$$= \frac{189 \times 2^3}{(2 \times 5)^2} = \frac{189 \times 8}{10^3}$$

Therefore, decimal expansion of given number will terminate after 3-places.

17. *(c) 91*

Explanation: Maximum number of students to have same number of pens and pencils

$$= \text{HCF}(1001, 910)$$
$$= \text{HCF}(11 \times 91, 10 \times 91)$$
$$= 91$$

18. *(b) 30°*

Explanation: Given, $\sin \alpha = \frac{\sqrt{3}}{2}$

$\Rightarrow \quad \sin \alpha = \sin 60° \Rightarrow \alpha = 60°$

and $\quad \cos \beta = 0 \Rightarrow \cos \beta = \cos 90°$

$\Rightarrow \quad \beta = 90°$

$\therefore \quad \beta - \alpha = 90° - 60° = 30°$

19. *(b) 7x – 5y = 12*

Explanation: Since the point P(x, y) is equidistant from the points A(7, 0) and B(0, 5),

$\therefore \quad PA = PB$ ...(i)

Using distance formula, we have

$$PA = \sqrt{(x-7)^2 + (y-0)^2}$$
$$= \sqrt{x^2 + y^2 + 49 - 14x}$$

Similarly, we have

$$PB = \sqrt{(x-0)^2 + (y-5)^2}$$
$$= \sqrt{x^2 + y^2 + 25 - 10y}$$

Substituting the values of PA and PB in (i), we get

$$\sqrt{x^2 + y^2 + 49 - 14x} = \sqrt{x^2 + y^2 + 25 - 10y}$$

Squaring both sides, we get

$$x^2 + y^2 + 49 - 14x = x^2 + y^2 + 25 - 10y$$
$\Rightarrow \quad 14x - 10y = 24 \Rightarrow 7x - 5y = 12$

20. *(b)* $1.\overline{42}$

Explanation: Let $x = 0.\overline{68} = 0.6868$ ...(i)

$\Rightarrow \quad 100x = 68.68$ ...(ii)

Subtracting (i) from (ii), we get

$$99x = 68$$
$$x = \frac{68}{99}$$

Similarly, let $y = 0.7\overline{3} = 0.7373$ ...(iii)

$\Rightarrow \quad 100y = 73.73$ ...(iv)

Subtracting (iii) from (iv), we get

$$99y = 73$$

$\Rightarrow \quad y = \frac{73}{99}$

Now, $0.\overline{68} + 0.\overline{73} = x + y$

$= \frac{68}{99} + \frac{73}{99}$

$= \frac{141}{99} = 1.424242...$

$= 1.\overline{42}$

Caution

➥ *For calculating the sum first convert the given decimals in rational form. Then, find the final answer in decimal form.*

SECTION - B

21. *(b) no solution*

Explanation: In consistent pair of equations means having no solution.

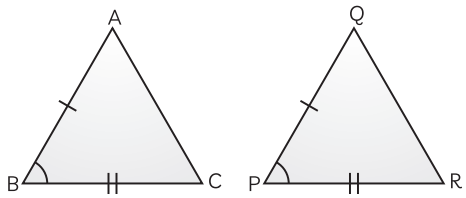
22. *(c) 2520*

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

23. *(b) $\angle B = \angle P$*

Explanation: Since, $\frac{AB}{PQ} = \frac{BC}{PR}$, then

Included angle is B and P



for two triangles to be similar by SAS criterion

$\angle B = \angle P$

24. *(a) 1*

Explanation: We have :

$(1 + \cot^2\theta)(1 - \cos\theta)(1 + \cos\theta)$

$= (1 + \cot^2\theta)(1 - \cos^2\theta) = \text{cosec}^2\theta \times \sin^2\theta$

$= \frac{1}{\sin^2\theta} \times \sin^2\theta = 1$

25. *(a) 0.5 cm*

Explanation: Let the radius of the circle be *r* cm.

$\because$ Circumference of the circle = 4 × Area of the circle

$\therefore \quad 2\pi r = 4\pi r^2$

$\Rightarrow \quad 2 = 4r$

$\Rightarrow \quad r = \frac{1}{2}$ cm

26. *(b) $\frac{3}{4}$*

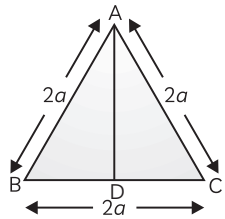
Explanation: Total possible outcomes = {HH, HT, TH, TT} i.e. 4

Outcomes favourable to Sakshi = {HH, HT, TH} *i.e.* 3

$\therefore$ P(Sakshi will start the game) = $\frac{3}{4}$

27. *(a) $\sqrt{3}\,a$ units*

Explanation: Here, ΔABC is an equilateral triangle AD is an attitude.



$\therefore$ In ΔABD

$AB^2 = AD^2 + BD^2$

[by Pythagoras theorem]

$(2a)^2 = AD^2 + (a)^2 \quad [\because BD = CD]$

$\Rightarrow \quad AD^2 = 4a^2 - a^2 = 3a^2$

$\Rightarrow \quad AD = AD = a\sqrt{3}$ units

$= \sqrt{3}a$ units

28. *(b) 24*

Explanation: Let there be *x* blue pencils in the bag.

$\therefore$ Total number of pencils in the bag = $(8 + x)$

Now, P_1 = Probability of drawing a blue pencils

$= \frac{x}{8+x}$

and P_2 = Probability of drawing a red pencils

$= \frac{8}{8+x}$

It is given that, $P_1 = 3P_2$

$\Rightarrow \quad \frac{x}{8+x} = 3 \times \frac{8}{8+x}$

$\Rightarrow \quad \frac{x}{8+x} = \frac{24}{8+x} \Rightarrow x = 24$

Hence, there are 24 blue pencils in the bag.

29. *(c) (3, 5)*

Explanation: The given lines are

$x - 3 = 0 \Rightarrow x = 3,$

which is parallel to *y*-axis.

and $y - 5 = 0 \Rightarrow y = 5,$

which is parallel to *x*-axis.

Hence, the lines intersect at (3, 5)

30. *(a) 81*

Explanation: H.C.F. of two numbers is 27.

So, let the number be $27a$ and $27b$.

Given, $27a + 27b = 135$

$\Rightarrow$ $a + b = 5$ ...(i)

Also, $27a \times 27b = 27 \times 162$

$\Rightarrow$ $ab = 6$

Now, $(a - b)^2 = (a + b)^2 - 4ab$

$\Rightarrow$ $a - b = 1$ ...(ii)

Solving (i) and (ii), we get

$a = 3$ and $b = 2$

So, numbers are 27×3, 27×2 *i.e.*, 81, 54.

31. *(d) 16 cm*

Explanation: $\because \Delta ABC \sim \Delta DEF$ (Given)

$\therefore \quad \frac{AB}{DE} = \frac{BC}{EF}$

$\Rightarrow \quad \frac{AB}{2AB} = \frac{8}{EF} \quad (\because DE = 2AB)$

$\Rightarrow \quad \frac{1}{2} = \frac{8}{EF}$

$\therefore \quad EF = 16$ cm

32. *(c) 60°*

Explanation: Given, $\sin x + \cos y = 1$

$\Rightarrow \sin 30° + \cos y = 1$ [Given, $x = 30°$]

$\Rightarrow \frac{1}{2} + \cos y = 1 \Rightarrow \cos y = 1 - \frac{1}{2} = \frac{1}{2}$

$\Rightarrow y = 60° \quad \left(\because \cos 60° = \frac{1}{2}\right)$

33. *(c) –1*

Explanation : α and β are the zeroes of the polynomial $x^2 + x + 1$.

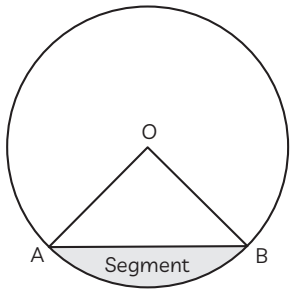
$\therefore \quad \alpha + \beta = -1$

and $\quad \alpha\beta = 1$

Now $\quad \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = -1$

34. *(a) Segment*

Explanation: The region enclosed by an arc and a chord of a circle is called segment of the circle.



35. *(d) 45 cm*

Explanation: Clearly, $\angle AEB = \angle FEC$

(vertically opposite angles)

and $\quad \angle ABC = \angle FCE$

(Alternate interior angles)

as $\quad AB \parallel CD$

$\therefore \quad \Delta ABE \sim \Delta FCE$

(By AA-similarity criterion)

$\therefore \quad \frac{AB}{FC} = \frac{BE}{CE} = \frac{AE}{FE}$

$\therefore \quad \frac{AB}{FC} = \frac{BE}{CE} \Rightarrow \frac{15}{6} = \frac{x}{4}$

$\Rightarrow \quad x = 10$

Also, $\quad \frac{AB}{FC} = \frac{AE}{FE} \Rightarrow \frac{15}{6} = \frac{y}{8}$

$\Rightarrow \quad y = \frac{15 \times 8}{6} = \frac{15 \times 4}{3}$

$= 5 \times 4 = 20$ cm

$\therefore$ Perimeter of $\Delta ABE = AB + AE + BE$

$AB + y + x$

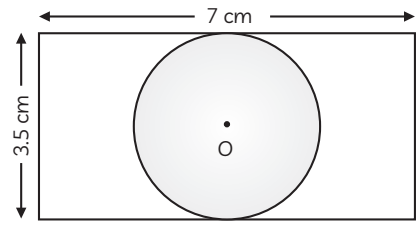
$= 15 + 20 + 10 = 45$ cm

36. *(c)* $\frac{77}{8} cm^2$

Explanation: Sides of rectangle are 7 cm and 3.5 cm

$\therefore$ Diameter of the largest circle that can be inscribed in the rectangle is 3.5 cm.

$\therefore \quad r = \frac{3.5}{2}$



Hence,

Area of circle $= \pi r^2 = \frac{22}{7} \times \left(\frac{3.5}{2}\right)^2$

$= \frac{22}{7} \times \frac{7}{4} \times \frac{7}{4} = \frac{77}{8} cm^2$

37. *(a) $2a - b + 1 = 0$*

Explanation: Since, $x = 2$ is a zero of $ax^2 - bx + 2$

$\therefore \quad a(2)^2 - b(2) + 2 = 0$

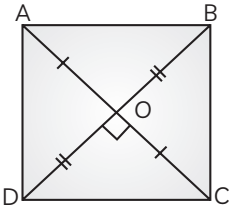
$\Rightarrow \quad 4a - 2b + 2 = 0$

$\Rightarrow \quad 2a - b + 1 = 0$

which is the required relation between a and b.

38. *(d) 13 cm*

Explanation:



Consider a rhombus ABCD with AC = 10 cm and BD = 24 cm

Since, diagonals of rhombus bisect each other at right angle

$\therefore$ $OA = OC = \frac{1}{2}AC = 5$ cm;

$OB = OD = \frac{1}{2}BD = 12$ cm

and $\angle AOB = 90°$

$\therefore$ In ΔAOB, by pythagoras theorem

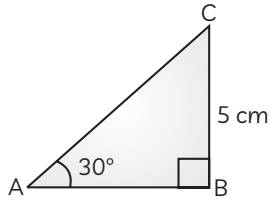
$AB^2 = OA^2 + OB^2$

$= (5)^2 + (12)^2 = 25 + 144 = 169$

$\Rightarrow$ $AB = \sqrt{109} = 13$ cm

39. *(c) 10 cm*

Explanation: We have, $\angle BAC = 30°$, *i.e.*, $\angle A = 30°$ and BC = 5 cm



Now, $\sin A = \frac{BC}{AC} \Rightarrow \sin 30° = \frac{5}{AC}$

$\Rightarrow$ $\frac{5}{AC} = \frac{1}{2}$ $\left[\because \sin 30° = \frac{1}{2}\right]$

$\Rightarrow$ $AC = 2 \times 5 = 10$ cm

40. *(d) $x^2 - x - 6$*

Explanation : Let the zeroes of required polynomial be α and β.

Then, $\alpha = -2$ and $\beta = 3$

$\therefore$ Equation of second degree polynomal is

$x^2 - (\alpha + \beta)x + \alpha\beta$

i.e., $x^2 - (-2 + 3)x + (-2)(3)$

i.e., $x^2 - x - 6$

⚠ Caution

➥ *Here the zeroes of polynomial is given, so first find the sum and product of the zeroes to find the required equation.*

SECTION - C

41. *(d) 59 masks of type A, and 41 masks of type B*

Explanation: Let, the mask of type A sold in April be x and type of mask B sold in April be y.

Then, $x + y = 100$ ...(i)

and $10x + 12y = 1082$ ...(ii)

Multiply equation (i) by 10 and subtract (ii) from (i).

$10x + 10y = 1000$

$10x + 12y = 1082$

$- \quad - \quad -$

$-2y = -82$

$y = 41$

Then, $x = 100 - 41 = 59$

42. *(d) ₹ 1100*

Explanation: Total Sales = $50 \times 10 + 50 \times 12$

$= 500 + 600$

$= 1100$

43. *(d) 165 masks of type A, and 85 masks of type B*

Explanation: For May, let, the mask of type A sold be x and type B be y.

Then, $x + y = 250$ ...(i)

and $11x + 13y = 2920$ ...(ii)

Multiply equation (i) by 11 and subtract it from equation (ii), we get

$11x + 11y = 2750$

$11x + 13y = 2920$

$- \quad - \quad -$

$-2y = -170$

$y = 85$

and $x = 250 - 85 = 165$

44. *(a) ₹ 3000*

Explanation: $11 \times 125 + 13 \times 125 = 1375 + 1625$

$=$ ₹ 3000

45. *(b) 180% in type A and 110% in type B*

Explanation:

Increase in type A $= \frac{165 - 59}{59} \times 100$

$= 179.66\% \simeq 180\%$

$$\text{Increase in type B} = \frac{85 - 41}{41} \times 100$$
$$= 107.31\%$$
$$\simeq 110\%$$

46. *(a) (5, 4)*

47. *(c) $\sqrt{72}$ units*

Coordinates of B are (6, 6)

Distance from origin

$$= \sqrt{(6-0)^2 + (6-0)^2}$$
$$= \sqrt{36 + 36}$$
$$= \sqrt{72} \text{ units}$$

48. *(b) (1, 5)*

If ABCD forms a parallelogram, then the diagonals bisects each other.

Mid-point of AC

$$= \left(\frac{2+5}{2}, \frac{7+4}{2}\right) = (3.5, 5.5)$$

Now, mid-point of diagonal, BD will be same. Let, the coordinates of D be (x, y)

Then,

$$\frac{6+x}{2} = 3.5 \text{ and } \frac{6+y}{2} = 5.5$$
$$x = 1 \text{ and } y = 5$$

49. *(a) $\sqrt{18}$ units*

Coordinates of A are (2, 7)

Coordinates of C are (5, 4)

Distance of AC

$$= \sqrt{(5-2)^2 + (4-7)^2}$$
$$= \sqrt{9 + 9}$$
$$= \sqrt{18} \text{ units}$$

50. *(d) $\sqrt{26}$ units*

Coordinates of B(6, 6)

Coordinates of D(1, 5)

Distance between BD

$$= \sqrt{(6-1)^2 + (6-5)^2}$$
$$= \sqrt{5^2 + 1^2}$$
$$= \sqrt{25 + 1}$$
$$= \sqrt{26} \text{ units}$$