

Tenth Class Maths

Model Paper

PART A & B

Max Marks: 80

TIME: 3.15 Hrs

Instructions:

1. Read the question paper carefully and understand.
2. Answer the questions under Part-A in the answer sheet provided.
3. Write the answer to the questions under Part-B in the space provided and attach it to the answer book let of Part -A.
4. Part-A contains 3 sections . Write the answers following the instructions given in each section.

PART – A

Time: 2.45 hrs.

Marks:60

Instructions:

1. Read the question paper carefully and understand.
2. Answer the questions under Part-A in the answer sheet provided.
3. Write the answer to the questions under Part-B in the space provided and attach it to the answer book let of Part -A.
4. Part-A contains 3 sections . Write the answers following the instructions given in each section.

SECTION: I

6 × 2 = 12

Instructions:

1. Answer ALL the following questions.
2. Each question carries 2 marks

1. Find the HCF of the 24 and 33 by using division algorithm
2. Is it right to say that $\cos(60^\circ + 30^\circ) = \cos 60^\circ \cos 30^\circ - \sin 60^\circ \sin 30^\circ$.
3. Find the sum of the first 12 terms of the AP $-37, -33, -29, \dots$
4. Length of the shadow of a 15 meter height pole is $5\sqrt{3}$ meters at 7 'O Clock in the morning. Then, what is the angle of elevation of the sun rays with the ground at the time?
5. $A = \{0, 2, 4\}$ find $A \cap \phi$ and $A \cap A$. comment.
6. Determine x so that 2 is the slope of the line through $P(2, 5)$ and $Q(x, 3)$

SECTION – II

6 × 4 = 24

Instructions:

1. Answer ALL the following questions.
2. Each question carries 4 marks

7. If $x^2 + y^2 = 10xy$, prove that $2 \log(x+y) = \log x + \log y + 2 \log 2 + \log 3$
8. Write the formula to find the median of a grouped data and explain the terms in it.
9. Find the value of
$$\frac{\sec 37^\circ}{\cos ec 53^\circ} - 2 \cot 45^\circ + \frac{\sin 60^\circ}{\cos 30^\circ}$$
10. Find two numbers whose sum is 27 and product is 182.
11. Check whether -150 is a term of the A.P. $11, 8, 5, 2, \dots$
12. Two angles are supplementary The larger angle is 30 less than twice the measure of the smaller angle. Find the measure of each angle.

SECTION – III

4 × 6 = 24

Instructions:

1. Answer any four of the following questions.
2. Each question carries 6 marks

13. Construct an Isosceles triangle whose base is 8 cm and altitude 4 cm. Then draw another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the Isosceles triangle.
14. A 1.5m tall boy is standing at some distance from a 30m tall building. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.
15. If A and B are $(-2, -2)$ and $(2, -4)$ respectively. Find the coordinates of P such that $AP = \frac{3}{7}AB$, P lies on the segment AB.
16. A toy is in the form of a cone mounted on a hemisphere of the same diameter. The diameter of the base and the height of the cone are 6 cm and 4 cm respectively. Determine the surface area of the toy. (use $\pi = 3.14$)
17. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is (i) 8? (ii) 13? (iii) less than or equal to 12? (iv) 5 will not come up either time? (v) 5 will come up at least once?

18. If the median of 60 observations given below is 28.5, then find the values of x and y

Class interval	0–10	10–20	20–30	30–40	40–50	50–60
Frequency	5	x	20	15	y	5

PART – B

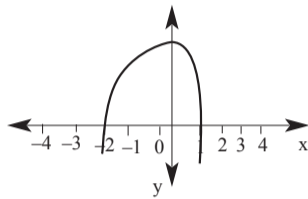
SECTION: I

Instructions:

1. Answer ALL the following questions.
2. 1 mark for Each question.
3. All the answers should be written in the question paper itself.
4. Marks will not be awarded for corrected, deleted answers.

1. Indicate the correct answers Write the English capital letters A, B, C, D in the bracket opposite the question 20

1. H C F of 36, 48 is
A. 24 B. 36 C. 12 D. 144
2. $\log_{10} \sqrt{4} + \log_{10} \sqrt{25}$ ()
A. 1 B. 2 C. 5 D. 10
3. Number of all the subsets of the set $A = \{x, y, z\}$ ()
A. 6 B. 8 C. 10 D. 12
4. If $p(x) = 2x^3 + 5x^2 - 7$, then the value of $p(0)$ ()
A. 7 B. 3 C. -7 D. 10
5. The following is the graph of the polynomial. Find the zeroes of the polynomial from the given graph ()



- 1) $-2, 3$ 2) $1, 3$ 3) $-2, 1$ 4) $3, 0$
6. If the pair of linear equations $5x - 4y + 10 = 0$ and $15x + ky + 6 = 0$ represents parallel lines, then the value of 'k' ()
A. 4 B. 12 C. -14 D. -12
7. In a quadratic equation $ax^2 + bx + c = 0$ if $b^2 - 4ac < 0$ then their roots are
A. real and distinct B. real and equal
C. imaginary D. none
8. If the n^{th} term of an arithmetic progression is $6n - 1$, then its 12th term is . . .
A. 71 B. 81 C. 48 D. 24
9. The distance of the point $P(x, y)$ from Y-axis is . . ()
A. $|x|$ B. $|y|$ C. $|x + y|$ D. $|x - y|$
10. Which of the following statement is False? ()
A. All circles are similar.
B. All squares are similar.
C. All right angle triangles are similar.
D. All equilateral triangles are similar
11. If $\Delta ABC \sim \Delta DEF$ and $DE : AB = 11:12$ Then area $\Delta ABC : \text{area } \Delta DEF =$ ()
A. $144 : 121$ B. $120 : 140$
C. $121 : 144$ D. $11 : 12$
12. The number of tangents that can be drawn to a circle from an interior point is .. ()
A. 0 B. 3 C. 2 D. 1
13. "The lateral surface area of right cone is πrl then the 'l' is represents , ()
A. height of the cone
B. lateral surface area of cone
C. radius of the cone
D. slant height of the cone
14. If $\sec A = \frac{36}{18\sqrt{3}}$ then $A =$ ()
A. 60° B. 90° C. 30° D. 45°
15. $\cot 36^\circ \cdot \cot 54^\circ + \cos 60^\circ =$ ()
A. $\frac{\sqrt{3}}{2}$ B. $\frac{3}{2}$ C. 2 D. $\frac{1}{2}$
16. A ladder touches a wall at a height of 4 m. The angle made by the ladder with the ground, if its length is $4\sqrt{2}$ m, will be ()
A. 30° B. 60° C. 45° D. 90°
17. Find the probability of getting a sum of the numbers on them is 7, when two dice are rolled at a time. ()
A. $\frac{2}{3}$ B. $\frac{1}{3}$ C. $\frac{1}{6}$ D. $\frac{4}{5}$
18. Let \bar{E} , be the complementary events, in a random experiment, then which of the following is true? ()
A. $P(E) + P(\bar{E}) = 2$ B. $P(E) + P(\bar{E}) = -1$
C. $P(E) + P(\bar{E}) = 1$ D. $P(E) + P(\bar{E}) = -2$
19. "The median of observations, $-2, 5, 3, -1, 4, 6$ is ... ()
A. 4 B. 5 C. 4.5 D. 3.5
20. The mean of the first 10 multiples of 5 is . . ()
A. 180 B. 270 C. 27.5 D. 18.5

ANSWERS

PART – A

1. $33 = (24 \times 1) + 9$
 $24 = (9 \times 2) + 6$
 $9 = (6 \times 1) + 3$
 $6 = (3 \times 2) + 0$
 \therefore H.C.F of 24 and 33 = 3
2. LHS = $\cos(60^\circ + 30^\circ) = \cos 90^\circ = 0$
RHS = $\cos 60^\circ \cdot \cos 30^\circ - \sin 60^\circ \cdot \sin 30^\circ$
 $= \frac{1}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{1}{2} = \frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4} = 0$
 \therefore It is right to say that $\cos(60^\circ + 30^\circ) = \cos 60^\circ \cdot \cos 30^\circ - \sin 60^\circ \cdot \sin 30^\circ$
3. Here $a = -37$, $d = -33 - (-37) = 4$, $n = 12$
$$s_n = \frac{n}{2} [2a + (n-1)d]$$

$$s_{12} = \frac{12}{2} [2(-37) + (12-1)4]$$

$$= 6(-74 + 44) = 6(-30) = -180$$

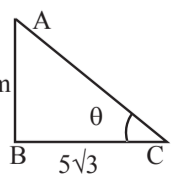
4. Let the angle of elevation of the sun rays at 7 'O Clock with the ground is θ
From ΔABC

$$\tan \theta = \frac{15}{5\sqrt{3}} = \frac{3}{\sqrt{3}} = \frac{\sqrt{3} \cdot \sqrt{3}}{\sqrt{3}} = \sqrt{3}$$

$$= \tan 60^\circ \Rightarrow \theta = 60^\circ$$

\therefore Angle of elevation of Sun rays = 60°

5. $A = \{0, 2, 4\}$, $\phi = \{\}$
 $A \cap \phi = \{0, 2, 4\} \cap \{\} = \{\} = \phi$
 $\therefore A \cap \phi = \phi$
 $A \cap A = \{0, 2, 4\} \cap \{0, 2, 4\}$



Continued on next page.

$$= \{0, 2, 4\} = A \quad \therefore A \cap A = A.$$

6. Given points P (2, 5) and Q (x, 3)

Slope of \overline{PQ} is 2

$$\text{i.e. } 2 = \frac{y_2 - y_1}{x_2 - x_1} \Rightarrow 2 = \frac{3 - 5}{x - 2} \Rightarrow 2 = \frac{-2}{x - 2}$$

$$\Rightarrow -2 = 2(x - 2)$$

$$\Rightarrow 2x = 2$$

$$\Rightarrow x = 1.$$

7. Given equation $x^2 + y^2 = 10xy$

Adding $2xy$ on both sides

$$x^2 + y^2 + 2xy = 10xy + 2xy$$

$$(x + y)^2 = 12xy$$

Applying 'log' on both sides

$$\log(x + y)^2 = \log(12xy)$$

$$\boxed{\log(a \times b) = \log a + \log b}$$

$$2 \log(x + y) = \log 12 + \log x + \log y$$

$$= \log 4 + \log 3 + \log x + \log y$$

$$= \log 2^2 + \log 3 + \log x + \log y$$

$$= 2 \log 2 + \log 3 + \log x + \log y$$

$$8. \text{ Median} = l + \frac{\left(\frac{n}{2} - cf\right)}{f} \times h$$

l = lower boundary of median class

n = number of observations

cf = cumulative frequency of class preceding the median class

f = frequency of median class

h = class size

9. $\cot 45^\circ = 1$

$$\sin 60^\circ = \frac{\sqrt{3}}{2} \quad \cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\frac{\sec 37^\circ}{\cos ec(90^\circ - 37^\circ)} - 2\left(1 + \frac{2}{\sqrt{3}}\right)$$

$$\frac{\sec 37^\circ}{\sec 37^\circ} - 2 + 1 = 1 - 2 + 1 = 0$$

10. Let the first number will be x

second number $27 - x$ ($\therefore 27 - x + x = 27$)

Product = $x(27 - x) = 182$

$$27x - x^2 - 182 = 0 \Rightarrow x^2 - 27x + 182 = 0$$

$$x^2 - 13x - 14x + 182 = 0$$

$$x(x - 13) - 14(x - 13) = 0$$

$$(x - 13)(x - 14) = 0$$

$$\Rightarrow x - 13 = 0, x - 14 = 0$$

$$x = 13, x = 14$$

If $x = 13$, then $27 - x = 27 - 13 = 14$

If $x = 14$, then $27 - x = 27 - 14 = 13$

\therefore Required two numbers = 13, 14 or 14, 13

11. Here $a = 11$, $d = 8 - 11 = -3$

Let $a_n = -150$

$$a + (n - 1)d = -150$$

$$11 + (n - 1)(-3) = -150$$

$$n - 1 = \frac{-150 - 11}{-3} = \frac{-161}{-3}$$

$$n = \frac{-161}{-3} + 1 = \frac{-161 + 3}{-3} = \frac{-158}{-3}$$

But n should be a possible

So, -150 is not a term of the given list numbers.

12. Let the larger supplementary angle be x°

Smaller supplementary angle be y°

As per problem

$$x = 2y - 3 \rightarrow (1)$$

Sum of the supplementary angles is 180°

$$x + y = 180 \rightarrow (2)$$

$$x + y = 180$$

$$x - 2y = -3$$

$$\begin{array}{r} - \\ + \\ \hline \end{array}$$

$$3y = 183 \Rightarrow y = 61$$

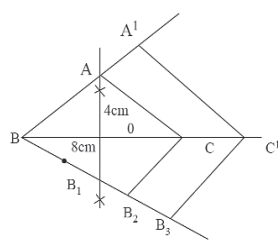
Substitute the value of y in (1) or (2)

$$x + y = 180$$

$$x + 61 = 180 \Rightarrow x = 119^\circ$$

\therefore Two angles are $119^\circ, 61^\circ$.

13.



Steps of construction

1) Draw a line segment $BC = 8$ cm

2) Draw the perpendicular bisector of BC and mark a point ' A ' on that such that $OA = 4$ cm

3) Join AB and AC to get the Isosceles triangle ABC

4) Draw a ray $\overline{B\bar{X}}$ making an acute angle with BC and the side opposite to vertex A .

5) Mark three points B_1, B_2 and B_3 such that $BB_1 = B_1B_2 = B_2B_3$ on $\overline{B\bar{X}}$

6) Join B_2C

7) Draw a line parallel to B_2C through B_3 meeting BC produced at C'

8) Draw a line parallel to AC through C' meeting BA produced at A'

9) $\triangle A'BC'$ is the required triangle.

14. Height of the building $CD = 30$ m

Height of the boy = $AB = 1.5$ m

Let the distance

between the boy and

building = x m

Let the distance the boy walked = d m

From $\triangle AED$, right angled at E

$$\tan 30^\circ = \frac{DE}{AE} = \frac{28.5}{x}$$

$$\frac{1}{\sqrt{3}} = \frac{28.5}{x} \Rightarrow x = 28.5\sqrt{3} \text{ m} \rightarrow (1)$$

From $\triangle FDE$ $\tan 60^\circ = \frac{DE}{FE} = \frac{28.5}{x - d}$

$$\sqrt{3} = \frac{28.5}{x - d}$$

$$(x - d)\sqrt{3} = 28.5, (28.5\sqrt{3} - d)\sqrt{3} = 28.5$$

$$3 \times 28.5 - \sqrt{3}d = 28.5$$

$$3 \times 28.5 - 28.5 = \sqrt{3}d$$

$$2 \times 28.5 = \sqrt{3}d \Rightarrow \sqrt{3}d = 57$$

$$d = \frac{57}{\sqrt{3}} = \frac{57}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{57\sqrt{3}}{3} = 19\sqrt{3}$$

\therefore Distance he walked towards building = $19\sqrt{3}$ m

15. We have $AP = \frac{3}{7}AB \Rightarrow \frac{AP}{AB} = \frac{3}{7}$

$$\frac{AP}{AP + PB} = \frac{3}{7} \quad (\because AB = AP + PB)$$

$$7AP = 3(AP + PB)$$

$$\Rightarrow 7AP - 3AP = 3PB$$

$$\Rightarrow 4AP = 3PB$$

$$\Rightarrow \frac{AP}{PB} = \frac{3}{4}$$

So P divides AB in the ratio = $3 : 4$

$$A = (-2, -2); B = (2, -4)$$

\therefore Coordinates of P are

$$\left(\frac{3(2) + 4(-2)}{3 + 4}, \frac{3(-4) + 4(-2)}{3 + 4}\right)$$

$$P(x, y) = \left(\frac{6 - 8}{7}, \frac{-12 - 8}{7}\right) \Rightarrow \left(\frac{-2}{7}, \frac{-20}{7}\right)$$

16. radius of the cone = radius of the hemisphere

$$= \frac{6}{2} = 3 \text{ cm}$$

height of the cone $h = 4$ cm

slant height of the cone

$$l = \sqrt{r^2 + h^2} = \sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25} = 5 \text{ cm}$$

surface area of the toy = CSA of the cone + CSA of the hemisphere

$$= \pi r l + 2\pi r^2 = 3.14 \times 3 \times 5 + 2 \times 3.14 \times 3 \times 3$$

$$= 47.1 + 56.52$$

$$= 103.62 \text{ cm}^2$$

17. The possible outcomes of the experiment are shown in the figure.

The number of total possible outcomes

$$= 6 \times 6 = 36$$

	1	2	3	4	5	6
1	1, 1	1, 2	1, 3	1, 4	1, 5	1, 6
2	2, 1	2, 2	2, 3	2, 4	2, 5	2, 6
3	3, 1	3, 2	3, 3	3, 4	3, 5	3, 6
4	4, 1	4, 2	4, 3	4, 4	4, 5	4, 6
5	5, 1	5, 2	5, 3	5, 4	5, 5	5, 6
6	6, 1	6, 2	6, 3	6, 4	6, 5	6, 6

i) Favourable outcomes to the event 'the sum of the two numbers is 8' are (2,6), (3,5), (4,4), (5,3), (6,2)

No. of favourable outcomes = 5

P(getting the sum of the two number is 8)

$$= \frac{5}{36}$$

ii) Favourable outcomes to the event 'the sum of the two numbers is 13' are 0

P(getting the sum of the two numbers is 13)

$$= \frac{0}{36} = 0$$

iii) Favourable outcomes to the event 'the sum of the two numbers less than or equal to 12' are 36

P(getting the sum of two numbers less than or equal to 12) = $\frac{36}{36} = 1$

(iv) Favourable outcomes to the event 5 will come up either time = {(5,1), (5,2), (5,3), (5,4), (5,5), (5,6), (1,5), (2,5), (3,5), (4,5), (6,5)}

No. of favourable outcomes to the '5 will come up either time' = 11

No. of favourable outcomes to the '5 will not come up either time' = $36 - 11 = 25$

P(getting 5 will not come up either time)

$$= \frac{25}{36}$$

(v) Favourable outcomes to the 5 will come up at least once = {(1,5), (2,5), (3,5), (4,5), (5,5), (6,5), (5,1), (5,2), (5,3), (5,4), (5,6)}

No. of favourable outcomes = 11

P(getting 5 will come up at least once)

$$= \frac{11}{36}$$

18.

C.I	Frequency	Cf
0-10	5	5
10-20	x	$5 + x$
20-30	20	$25 + x$
30-40	15	$40 + x$
40-50	y	$40 + x + y$
50-60	5	$45 + x + y$

$$\text{Median} = l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$$

$$\Sigma f = n = 60$$

$$x + y = 60 - 45 = 15$$

$$x + y = 15$$

Median is 28.5

$$l = 20$$

$$\frac{n}{2} = \frac{60}{2} = 30$$

cf- cumulative frequency = $5 + x$

$$28.5 = 20 + \frac{30 - 5 - x}{20} \times 10$$

$$28.5 = 20 + \frac{25 - x}{2}$$

$$\frac{25 - x}{2} = 28.5 - 20 = 8.5$$

$$25 - x = 2 \times 8.5$$

$$x = 25 - 17 = 8$$

$$\text{from } x + y = 15$$

$$y = 7$$

PART - B

1) C; 2) A; 3) B; 4) C; 5) C;

6) D; 7) C; 8) A; 9) A; 10) C;

11) A; 12) A; 13) D; 14) C; 15) B;

16) C; 17) C; 18) C; 19) D; 20) C.

Prepared by

JAYAPRAKASH REDDY

SA (Maths)

