CBSE Class 10 Maths (Standard) Question Paper 2020 Set 3

CLASS: X

MATHEMATICS STANDARD

SET 3 SOLVED (CODE : 30/5/3)

General Instructions:

Read the following instructions very carefully and strictly follow them:

i. This question paper comprises four sections – A, B, C and D. This question paper carries 40 questions. All questions are compulsory.
ii. Section A: Question numbers 1 to 20 comprises of 20 questions of one mark each.
iii. Section B: Question numbers 21 to 26 comprises of 6 questions of two marks each.
iv. Section C: Question numbers 27 to 34 comprises of 8 questions of three marks each.
v. Section D: Question numbers 35 to 40 comprises of 6 questions of four marks each.
vi. There is no overall choice in the question paper. However, an internal choice has been provided in 2 questions of one mark, 2 questions of two marks, 3 questions of three marks and 3 questions of four marks. You have to attempt only one of the choices in such questions.
vii. In addition to this, separate instructions are given with each section and question, wherever necessary.
viii. Use of calculators is not permitted.

SECTION – A

Question numbers 1 to 20 carry 1 mark each.

Question numbers 1 to 10 are multiple choice questions.

Choose the correct option.

1. The value(s) of k for which the quadratic equation $2x^2 + 5x + 2 = 0$ has equal roots, is

(a) 4 (b) ± 4 (c) -4 (d) 0

2. Which of the following is **not** an A.P.?

(a) -1.2, 0.8, 2.8, ….
(b) $3, 3+\sqrt{2}, 3+2\sqrt{2}, 3+3\sqrt{2}, ...$
(c) $\frac{4}{3}, \frac{7}{3}, \frac{9}{3}, \frac{12}{3}, ...$
(d) $\frac{-1}{5}, \frac{-2}{5}, \frac{-3}{5}, ...$

3. The radius of sphere (in cm) whose volume is 12π cm^3, is

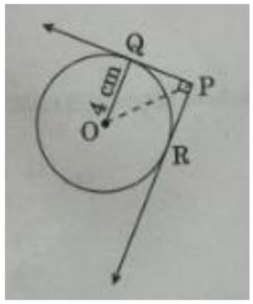
(a) 3 (b) $3\sqrt{3}$ (c) $3^{2/3}$ (d) $3^{1/3}$

4. The distance between the points (m, -n) and (-m, n) is

(a) $\sqrt{m^2+n^2}$ (b) m + n (c) $2\sqrt{m^2+n^2}$ (d) $\sqrt{2m^2+2n^2}$

5. In Figure-1, from an external point P, two tangents PQ and PR are drawn to a circle of radius 4 cm with centre O. If $\angle QPR = 90°$, then length of PQ is

(a) 3 cm (b) 4 cm (c) 2 cm (d) $2\sqrt{2}$

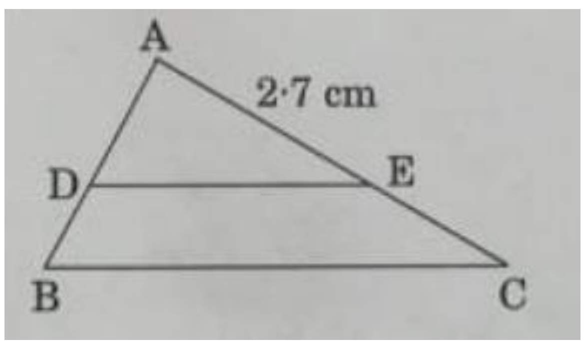


6. On dividing a polynomial p(x) by $x^2 - 4$, quotient and remainder are found to be x and 3 respectively. The polynomial p(x) is

(a) $3x^2 + x - 12$ (b) $x^3 - 4x + 3$ (c) $x^2 + 3x - 4$ (d) $x^3 - 4x - 3$

7. In Figure-2, DE || BC. If $\frac{AD}{DB} = \frac{3}{2}$ and AE=2.7 cm, then EC is equal to

(a) 2.0 cm (b) 1.8 cm (c) 4.0 cm (d) 2.7 cm



8. The point on the x-axis which is equidistant from (-4, 0) and (10, 0) is

(a) (7, 0) (b) (5, 0) (c) (0, 0) (d) (3, 0)

(OR)

The centre of a circle whose end points of a diameter are (-6, 3) and (6, 4) is

(a) (-8, -1) (b) (4, 7) (c) $\left(0, \frac{7}{2}\right)$ (d) $\left(4, \frac{7}{2}\right)$

9. The pair of linear equations

$$\frac{3x}{2} + \frac{5y}{3} = 7 \; and \; 9x + 10y = 14 \; is$$

(a) consistent (b) inconsistent

(c) consistent with one solution (d) consistent with many solutions

10. In figure-3, PQ is tangent to the circle with ccentre at O, at the point B. If $\angle AOB = 100°, then \angle ABP$ is equal to

(a) 50° (b) 40° (c) 60° (d) 80°

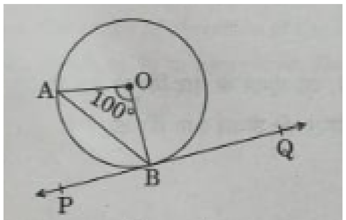


Figure-3

Fill in the blanks in question number 11 to 15

11. Simplest form of $\frac{1+\tan^2 A}{1+\cot^2 A}$ is __________

12. If the probability of an event E happening is 0.23, then $P(\overline{E}) =$ ________

13. All concentric circles are ___________ to each other.

14. The probability of an event that is sure to happen, is _______

15. AOBC is a rectangle whose three vertices are A(0, – 3), O(0, 0) and B(4, 0). The length of its diagonals is ________________.

Answer the following question numbers 16 to 20

16. Write the value of $\sin^2 30° + \cos^2 60°$

17. Form a quadratic polynomial, the sum and product of whose zeroes are (-3) and 2 respectively.

(OR)

Can $(x^2 - 1)$ be a remainder while dividing $x^4 – 3x^2 + 5x – 9$ by $(x^2 + 3)$?

18. Find the sum of the first 100 natural numbers.

19. The LCM of two numbers is 182 and their HCF is 13. If one of the numbers is 26, find the other

20. In figure – 4, the angle of elevation of the top of a tower from a point C on the ground, which is 30 m away from the foot of the tower, is 30°. Find the height of the tower.

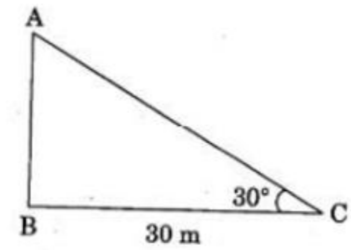


Figure-4

SECTION – B

Question numbers 21 to 26 carry 2 marks each.

21. A cone and a cylinder have the same radii but the height of the cone is 3 times that of the cylinder. Find the ratio of their volumes.
22. In figure – 6, a quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = BC + AD.

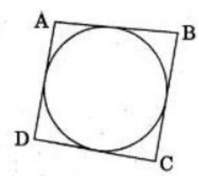


Figure-6

(OR)

In figure – 7, find the perimeter of ΔABC, if AP = 12 cm.

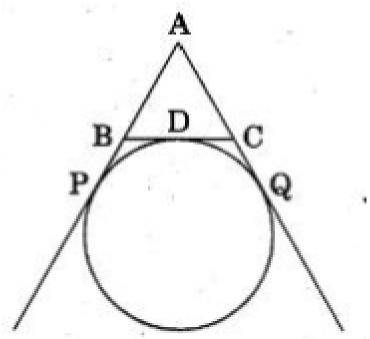
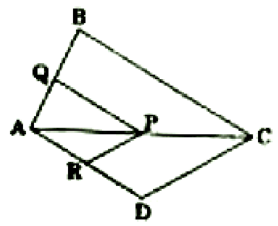


Figure-7

23. Find the mode of the following distribution:

Marks:	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of students:	4	6	7	12	5	6

24. In Figure-7, If PQ || BC and PR || CD, Prove that $\frac{QB}{AQ} = \frac{DR}{AR}$



25. Show that $5+2\sqrt{7}$ is an irrational number, where $\sqrt{7}$ is given to be an irrational number.

26. If A, B and C are interior angles of a ΔABC, then show that $\cos\left(\frac{B+C}{2}\right) = \sin\left(\frac{A}{2}\right)$.

SECTION – C

27. Prove that:

$$\left(\sin^4\theta - \cos^4\theta + 1\right)\operatorname{cosec}^2\theta = 2$$

28. Find the sum: $(-5)+(-8)+(-11)+...+(-230)$

29. Construct a ΔABC with sides BC = 6 cm, AB = 5 cm and $\angle ABC = 60°$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of ΔABC

(OR)

Draw a circle of radius 3.5 cm. Take a point P outside the circle at a distance of 7 cm from the centre of the circle and construct a pair of tangents to the circle from that point.

30. In Figure-B, ABCD is a parallelogram, A semicircle with centre O and the diameter AB has been drawn and it passes through D. If AB = 12 cm and OD $\perp$ AB, then find, the area of the shaded region. (use $\pi = 3.14$)

31. Read the following passage and answer the questions given at the end :

Diwali Fair

A game in a booth at a Diwali Fair involves using a spinner first. Then, if the spinner stops on an even number, the player is allowed to pick a marble from a bag. The spinner and the marbles in the bage are respresented in Figure - 8. Prizes are given, when a black marbles is picked. Shweta plays the same once.

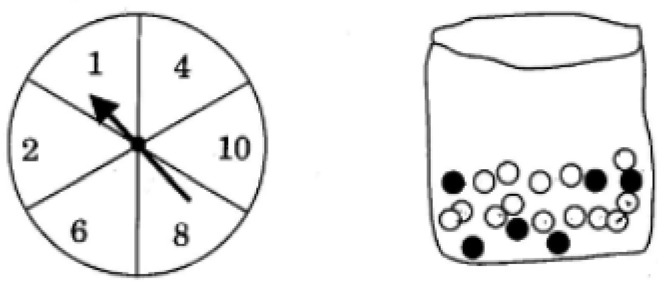


Figure-8

(i) What is the probability that she will be allowed to pick a marble from the bag ?

(ii) Suppose she is allowed to pick a marble from the bag, what is the probability of getting a prize, when it is given that the bag contains 20 balls out of which 6 are black ?

32. A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.

(OR)

The present age of a father is three years more than three times the age of his son. Three years hence the father's age will be 10 years more than twice the age of the son. Determine their present ages.

33. Find the ratio in which the y-axis divides the line segment joining the points (6, -4) and (-2, -7). Also find the point of intersection.

(OR)

Show that the points (7, 10), (-2, 5) and (3, -4) are vertices of an isosceles right triangle.

34. Use Euelid Division Lemma to show that the square of any positive integer is either of the form 3q or 3q + 1 for some integer q.

SECTION – D

Question numbers 35 to 40 carry 4 marks each.

35. Some of the areas of two squares is 544 m^2. If the difference of their perimeter is 32 m, find the sides of the two squares.

(OR)

A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 2 km upstream than to return downstream to the same spot. Find the speed of the stream.

36. The distribution given below shows the number of wickets taken by bowlers in one-day cricket matches. Find the mean and the median of the number of wickets taken.

37. A statue 1.6m tall, stands on the top of a pedestal.From a point on the ground, the angl of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal.

$\left(Use\sqrt{3}=1.73\right)$

38. Obtain other zeroes of the polynomial p(x) = $2x^4 - x^3 - 11x^2 + 5x + 5$ if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$.

(OR)

What minimum must be added to $2x^3 - 3x^2 + 6x + 7$ so that the resulting polynomial will be divisible by

$x^2 - 4x + 8$?

39. In a cylindrical vessel of radius 10 cm, containing some water, 9000 small spherical balls are dropped which are completely immersed in water which raises the water level. If each spherical ball is of radius 0.5 cm, then find the rise in the level of water in the vessel.

40. If a line is drawn parallel to one side of a triangle to intersect other two sides at distict points, prove that other two sides are divided in the same ratio.

CBSE Class 10 Maths (Standard) Question Paper Solution 2020 Set 3

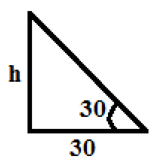
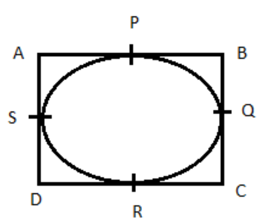
CLASS: X

MATHEMATICS STANDARD SOLVED

SET 3 (CODE: 30/5/3) SERIES: JBB/5

Q. NO	SOLUTION	MARKS
	SECTION – A	
1.	(B) ± 4	1
2.	(C) $\frac{4}{3}, \frac{7}{3}, \frac{9}{3}, \frac{12}{3}, \ldots$	1
3.	(C) $3^{\frac{2}{3}}$	1
4.	(c) $2\sqrt{m^2+n^2}$	1
5.	(B) 4 cm	1
6.	(B) $x^3 - 4x + 3$	1
7.	(B) 1.8 cm	1
8.	(D) (3, 0) OR (C) $\left(0, \frac{7}{2}\right)$	1 1
9.	(B) inconsistent	1
10.	(A) 50°	1
11.	$\tan^2 A$	1
12.	P(E) = 0.023 $P\left(\overline{E}\right) = 1 - P(E)$	1

	$=1-0.023$ $=0.977$	
13.	Similar	1
14.	1	1
15.	5 units	1
16.	$\sin^2 30+\cos^2 60=\left(\frac{1}{2}\right)^2+\left(\frac{1}{2}\right)^2=2\times\frac{1}{4}=\frac{1}{2}$	½ + ½ =1
17.	$k\left[x^2+3x+2\right]$ **OR** **No.** x^2-1 can't be remainder. Because the degree of remainder should be less than the degree of the divisor.	1 1
18.	$S_n=\frac{n(n+1)}{2}$ $S_{100}=\frac{100\times101}{2}=5050$	½ ½
19.	LCM × HCF = Product 182 × 13 = 2 6 × x $x=\frac{182\times\cancel{13}}{\cancel{26}\,2}$ x = 91	½

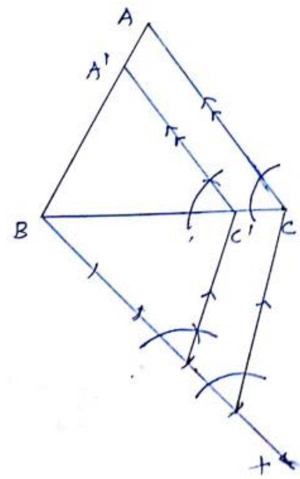
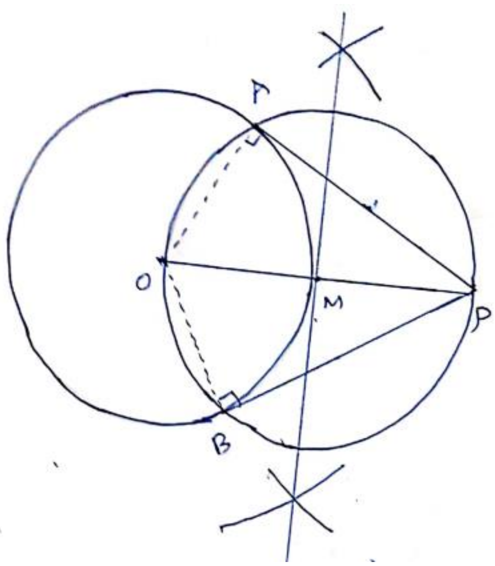
	Other number = 91	½
20.	 $\tan 30 = \frac{1}{\sqrt{3}} = \frac{h}{30}$ $h = \frac{30}{\sqrt{3}} = 10\sqrt{3}m$	½ ½
SECTION – B		
21.	As per question Cone Cylinder Radius = r radius = r Height = 3h height = h $\frac{V_{cone}}{V_{\text{cylinder}}} = \frac{\frac{1}{3}\pi r^2 \times 3h}{\pi r^2 h} = 1:1$	½ 1 + ½
22.	Let P, Q, R and S be point of contact.  $\left.\begin{matrix} AP = AS \\ BP = BQ \\ CQ = CR \\ DS = DR \end{matrix}\right]$ Tangents drawn from external point of circle	½ ½

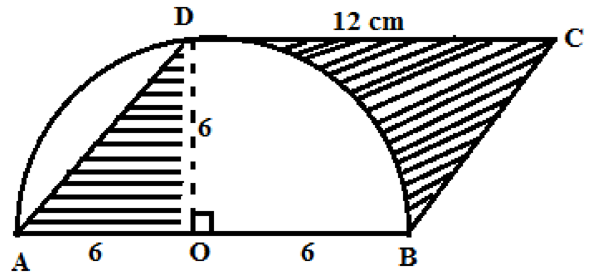
	AB + CD = AP + BP + CR + RD = AS + BQ + CQ + DS = AS + DS + BQ + CQ = AD + BC Hence proved.	1
	(OR)	
	Perimeter of ΔABC = AB + BC + AC = AB + BD + CD + AC	½
	= AB + BP + CQ + AC [Since BD = BP and CD = CQ] = AP + AQ	½
	= 2AP [AP = AQ, Tangents drawn from external point] = 2 × 12 = 24 cm.	½
		½
23.	Modal class : 30 – 40	
	$\ell = 30, \quad f_1 = 12, \quad f_0 = 7, \quad f_2 = 5, \quad h = 10$	½
	$mode = \ell + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] \times h$	½
	$= 30 + \left[\frac{12 - 7}{24 - 7 - 5} \times 10\right]$ $= 30 + \left[\frac{5}{12} \times 10\right]$ $= 30 + \frac{50}{12} = 30 + 4.16\ldots\ldots$	

	$= 34.17$	1
24.	Given, PQ ∥ BC in ΔABC By BPT, $\frac{AQ}{BQ} = \frac{AP}{PC}$ … (1) PR ∥ CD in ΔADC By BPT, $\frac{AR}{DR} = \frac{AP}{PC}$ … (2) From (1) and (2) $\frac{AQ}{BQ} = \frac{AR}{DR}$ $\frac{DR}{AR} = \frac{BQ}{AQ}$ Hence proved.	½ ½ 1
25.	Let $5+2\sqrt{7}$ be rational. So $5 + 2\sqrt{7} = \frac{a}{b}, where'a'and'b'are\ integers\ and\ b \neq 0$ $2\sqrt{7} = \frac{a}{b} - 5$ $2\sqrt{7} = \frac{a-5b}{5}$ $\sqrt{7} = \frac{a-5b}{2b}$ Since ‘a’ and ‘b’ are integers a – 5b is also an integer. $\frac{a-5b}{2b}$ is rational. So RHS is rational. LHS should be rational. but it is given that $\sqrt{7}$ is irrational .Our assumption is wrong. So $5+2\sqrt{7}$ is an irrational number.	½ ½ 1

	(OR) $12^n = (2 \times 2 \times 3)^n$ If a number has to and with digit 0. It should have prime factors 2 and 5. By fundamental theorem of arithmetic, $12^n = (2 \times 2 \times 3)^n$ It doesn't have 5 as prime factor. So 12^n cannot end with digit 0.	1 1
26.	Given A, B and C are interior angles of ΔABC, A + B + C = 180° (Angle sum property of triangle) B + C = 180 – A $\frac{B+C}{2} = \frac{180-A}{2} = 90 - A/2$ $\cos\left(\frac{B+C}{2}\right) = \cos\left(90 - A/2\right)$ $\cos\left(\frac{B+C}{2}\right) = \sin A/2$	1 1
SECTION – C		
27.	$\left[\left(\sin^2\theta\right)^2 - \left(\cos^2\theta\right)^2 + 1\right]\cos ec^2\theta$ $\left[\left(\sin^2\theta + \cos^2\theta\right)\left(\sin^2\theta - \cos^2\theta\right) + 1\right]\cos ec^2\theta$ $\left(\sin^2\theta - \cos^2\theta + 1\right)\cos ec^2\theta$	½ ½

	$\left(\sin^2\theta - \left(1-\sin^2\theta\right)+1\right)\operatorname{cosec}^2\theta$ $\left(\sin^2\theta - 1+\sin^2\theta+1\right)\operatorname{cosec}^2\theta$ $2\sin^2\theta\times\operatorname{cosec}^2\theta = 2$ Hence proved.	2
28.	$(-5)+(-8)+(-11)+....(-230)$ $a=-5$ $d=-8+5=-3$ $a_n = l = -230$ Number of terms $n=\frac{l-a}{d}+1$ $=\frac{-230+5}{-3}+1=\frac{-225}{-3}+1$ $n=75+1=76$ $S_n=\frac{n}{2}[a+l]$ $=\frac{76}{2}[-5-230]=38\times-235$ Sum $=-8930$	1 1 1

29.	For correct construction of Δ ABC AB = 5 cm, BC= 6 cm , $\angle B = 60°$  A'B C' is required similar Δ. A' B C' is similar to ABC $\frac{A'B}{AB} = \frac{BC'}{BC} = \frac{A'C'}{AC} = \frac{3}{4}$ For correct construction of similar triangle with scale factor ¾ OR  For correct construction of given circle OP = 7cm , OA = OB = 3.5 cm.	1 2 1

	PA and PB are required tangents to the circle with centre O. For correct construction of tangents	2
30.	ABCD is a parallelogram. AB = 12 cm = diameter Radius = 6 cm  Area of shaded = ar(parallelogram) – ar(quadrant) $= AB \times OD - \frac{1}{4} \times \pi \times 6^2$ $= 12 \times 6 - \frac{1}{4} \times 3.14 \times 6 \times 6$ $= 72 - 28.26$ $= 43.74 cm^2$	1 1 1
31.	(i) P(to pick a marble from the bag) = P(spinner stops an even number) A = {2, 4, 6, 8, 10} n (A) = 5 n (S) = 6 $\Rightarrow P(A) = \frac{n(A)}{n(S)} = \frac{5}{6}$	½ 1

	(ii) P(getting a prize) = P(bag contains 20 balls out of which 6 are black) $= \frac{6}{20} = \frac{3}{10}$	½ 1
32.	Let the fraction be $\frac{x}{y}$ as per the question, $\frac{x-1}{y} = \frac{1}{3}$ 3x – y = 3 ……………. 1 and, $\frac{x}{y+8} = \frac{1}{4}$ 4x = 8 + y 4x – y = 8 …………… 2 By elimination, $\Theta \begin{array}{l} 3x - y = 3 \\ \underline{4x - y = 8} \\ -x = -5 \\ x = 5 \end{array}$ $Put\ x = 5\ in 1$ $15 - y = 3$ $y = 12$ $\therefore The\ required\ fraction\ is\ \frac{5}{12}$	1 ½ 1 + ½

OR

Let the present age of son be ‘x’ years

	Father	Son
Present age	3x + 3	X
Three years hence	3x + 6	x + 3

1

As per question,

$3x + 6 = 10 + 2(x + 3)$

$3x + 6 = 10 + 2x + 6$

$x = 10$ 1

Father’s present age = 3x + 3

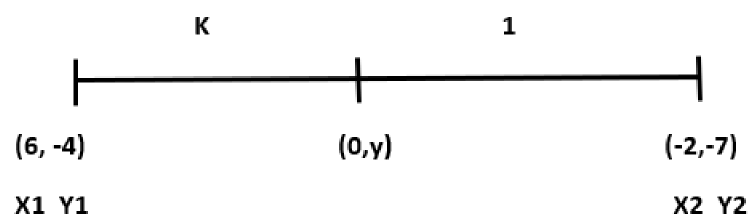
$= 3 \times 10 + 3 = 33$

∴ Present age of son = 10 years

Present age of father = 33 years 1

33. Y axis divides the line segment any point on y – axis is of the form (o, y) ½

As per the question



½

As per section formula,

$$P(x,y) = \left(\frac{kx_2+x_1}{k+1}, \frac{ky_2+y_1}{k+1}\right)$$

$$= \left(\frac{-2k+6}{k+1}, \frac{-7k-4}{k+1}\right)$$

$$\frac{-2k+6}{k+1} = 0$$

$-2k+6=0$

$2k=6$

$k=3$ 1

$\therefore Ratio\, 3:1$

$y = \frac{-7k-4}{k+1} = \frac{-21-4}{4} = \frac{-25}{4}$ 1

$\therefore Point\ of\ intersection \left(0, \frac{-25}{4}\right)$

(OR)

Let A (7, 10) B(-2, 5) C(3, -4) be the vertices of triangle. ½

Distance between 2 points $(x_1, y_1)\ (x_2, y_2) = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$AB = \sqrt{9^2+5^2} = \sqrt{81+25} = \sqrt{106}$

$BC = \sqrt{5^2+9^2} = \sqrt{25+81} = \sqrt{106}$ 1 + ½

$CA = \sqrt{4^2+14^2} = \sqrt{16+196} = \sqrt{212}$

(by pythagoren theorem)

$AB^2 + BC^2 = AC^2$

$\left(\sqrt{106}\right)^2 + \left(\sqrt{106}\right)^2 = \left(\sqrt{212}\right)^2$ 106 + 106 = 212

$\therefore$ ABC is an isosceles right angled Δ. 1

34.	Let 'a' be any positive integer and b = 3, if a is divided by b by EDL, a = 3m + r, m is any positive integer and $0 \leq r < 3$ If r = 0, a = 3m $a^2 = (3m)^2 = 3 \times 3m^2$ $a^2 = 3q$, where $3m^2 = q$ r = 1, a = 3m + 1 $a^2 = (3m+1)^2 = 9m^2 + 6m + 1$ $= 3(3m^2 + 2m) + 1$ $a^2 = 3q + 1$ where $q = 3m^2 + 2m$ r = 2, a = 3m + 2 $a^2 = (3m+2)^2 = 9m^2 + 12m + 4$ $= 9m^2 + 12m + 3 + 1$ $= 3(3m^2 + 4m + 1) + 1$ $a^2 = 3q + 1$, where $q = 3m^2 + 4m + 1$ ∴ The square of any positive integer is of the form 3q or 3q + 1 for some integer q.	1 1 + ½ ½

SECTION – D

35.	Let the sides of the two squares be x and y (x > Y) difference of perimeter is = 32 $4x - 4y = 32$ $X - y = 8 \Rightarrow y = x - 8$ Sum of area of two squares = 544 $x^2 + y^2 = 544$ $x^2 + (x - 8)^2 = 544$ $x^2 + x^2 + 64 - 16x = 544$ $2x^2 - 16x = 480$ $\div 2, \quad x^2 - 8x = 240$ $x^2 - 8x - 240 = 0$ $(x - 20)(x + 12) = 0$ $X = 20, -12$ Side can't be negative. So $x = 20$ $y = x - 8 = 20 - 8 = 12$ $\therefore$ Sides of squares are 20 cm,12cm	1 2 1

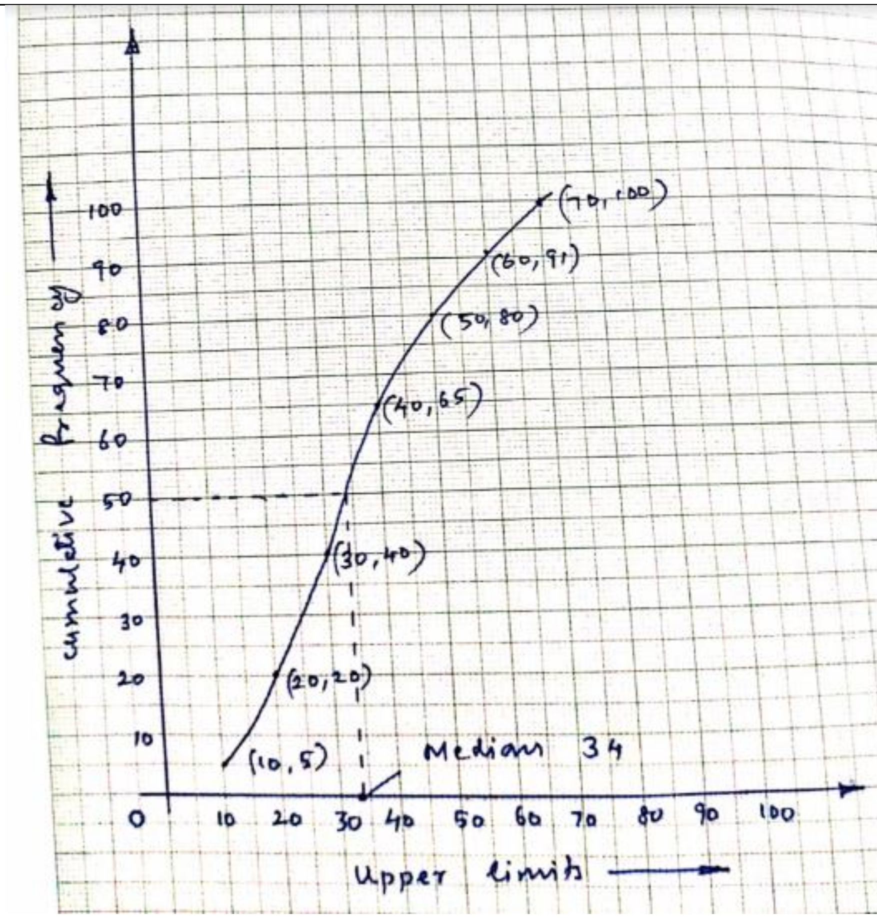
	(OR)	
	Speed of boat = 18 km/hr Let speed of the stream be $= x$ km/hr Speed of upstream $=(18-x)\, km/hr$ Speed of downstream $=(18+x)\, km/hr$ Distance = 24 km Time $=\frac{\text{Distance}}{\text{Speed}}$	1
	As per question, $\frac{24}{18-x}-\frac{24}{18+x}=1$	1
	$24\left[\frac{1}{18-x}-\frac{1}{18+x}\right]=1$ $\frac{18+x-18+x}{(18-x)(18+x)}=\frac{1}{24}$ $\frac{2x}{324-x^2}=\frac{1}{24}$ $324-x^2=48x$ $x^2+48x-324=0$ $(x+54)(x-6)=0$ $x=6,\ -54$ $\therefore\quad x=6\ km/hr$ Speed of stream $=6\ km/hr$	2

36.

Age	No. of persons	Class	CF
0 – 10	5	Less than 10	5
10 – 20	15	Less than 20	20
20 – 30	20	Less than 30	40
30 – 40	25	Less than 40	65
40 – 50	15	Less than 50	80
50 – 60	11	Less than 60	91
60 – 70	9	Less than 70	100

Coordinates to plot less than ogive: (10, 5) (20, 20) (30, 40) (40, 65) (50, 80) (60, 91)(70, 100) 2

N = 100 , N/2 = 50, Median = 34



2

(OR)

To find mean

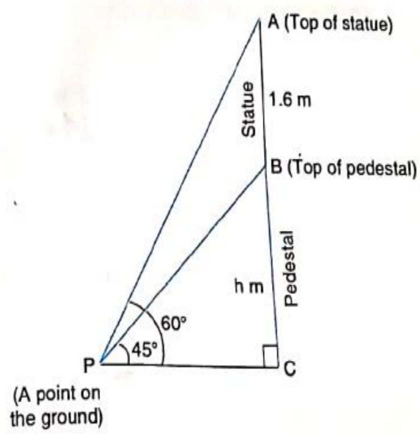
Number of wickets	Number of bowlers (f)	xi	$u_i = \frac{x_i - a}{h}$	$u_i f_i$
20 – 60	7	40	-3	-21
60 – 100	5	80	-2	-10
100 – 140	16	120	-1	-16
140 – 180	12	160	0	0
180 – 220	2	200	1	2
220 – 260	3	240	2	6
	45			**-39**

1

	Assumed mean a = 160 Class size h = 40 $Mean\ \bar{x} = a + \left(\frac{\sum f_i u_i}{\sum f_i} \times h\right)$ $= 160 + \left(\frac{\cancel{-39}\ -13}{\cancel{45}\ \cancel{9}\ 3} \times \cancel{40}\right)$ $= 160 + \left(\frac{-104}{3}\right)$ $= 160 - 34.66\ ...$ $= 160 - 34.67$ $\bar{x} = 125.33$	1
	To find median, **Number of workers CI** / **No. of bowlers (f)** / **CF** 20 – 60 / 7 / 7 60 – 100 / 5 / 12 100 – 140 / 16 / 28 140 – 180 / 12 / 40 180 – 220 / 2 / 42 220 – 260 / 3 / <u>45</u> N = 45, > N/2 ➔ > 22.5 Median class: 100 – 140 F = 16 h = 40	1

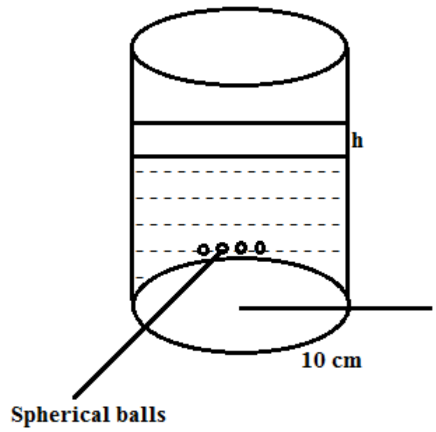
Median table:

Number of workers CI	No. of bowlers (f)	CF
20 – 60	7	7
60 – 100	5	12
100 – 140	16	28
140 – 180	12	40
180 – 220	2	42
220 – 260	3	45

	CF = 12 l = 100 $Median = \ell + \left(\frac{N/2 - CF}{f} \times h \right)$ $= 100 + \left(\frac{\frac{45}{2} - 12}{\not{16}\,4} \times \not{40}\,10 \right)$ $= 100 + \frac{105}{4} = 100 + 26.25$ $= 126.25$	1
37.	As per figure, BC = h m  In right triangle ACP, $\tan 60° = \frac{AC}{PC}$ $\Rightarrow \sqrt{3} = \frac{AB + BC}{PC}$ $\Rightarrow \sqrt{3} = \frac{1.6 + h}{PC}$ … (1) In right triangle BCP, $\tan 45° = \frac{BC}{PC}$ $\Rightarrow 1 = \frac{h}{PC}$ … (2)	1 1

	Dividing (1) by (2), we get $\frac{\sqrt{3}}{1}=\frac{1.6+h}{h}$ $\Rightarrow \quad h\sqrt{3}=1.6+h$ $\Rightarrow \quad h\left(\sqrt{3}-1\right)=1.6$ $\Rightarrow \quad h=\frac{1.6}{\sqrt{3}-1}$ $\Rightarrow \quad h=\frac{1.6\left(\sqrt{3}+1\right)}{\left(\sqrt{3}-1\right)\left(\sqrt{3}+1\right)}$ $\Rightarrow \quad h=\frac{1.6\left(\sqrt{3}+1\right)}{3-1}$ $\Rightarrow \quad h=\frac{1.6\left(\sqrt{3}+1\right)}{2}$ $\Rightarrow \quad h=0.8\left(\sqrt{3}+1\right)$ h=0.8(1.73+1)=0.8 x 2.73 =2.184m Hence, the height of the pedestal is 2.184 m	1+ ½ ½
38.	p(x) = $2x^4 - x^3 - 11x^2 + 5x + 5$ Two zeros are $\sqrt{5}$ *and* $-\sqrt{5}$ $\therefore x=\sqrt{5} \quad x=-\sqrt{5}$ $\left(x-\sqrt{5}\right)\left(x+\sqrt{5}\right)=x^2-5$ is a factor of p*(x)* To find other zeroes	1

	$2x^2 - x - 1$ $x^2 - 5 \overline{)\,2x^4 - x^3 - 11x^2 + 5x + 5}$ $\underset{-}{2x^4} \quad \underset{+}{- 10x^2}$ $-x^3 - x^2 + 5x$ $\underset{+}{-x^3} \quad \underset{-}{+ 5x}$ $-x^2 + 5$ $-x^2 + 5$ 0 $\therefore 2x^2 - x - 1 \, is\, a\ factor$ $2x^2 - 2x + x - 1 = 0$ $2x(x - 1) + 1(x - 1) = 0$ $(2x + 1) \qquad (x - 1) = 0$ $x = -1/2 \qquad x = 1$ $\therefore$ Other zeroes are -1/2, 1 **(OR)** $2x + 5$ $x^2 - 4x + 8 \overline{)\,2x^3 - 3x^2 + 6x + 7}$ $\underset{-}{2x^3} \underset{+}{- 8x^2} \underset{-}{+ 16x}$ $5x^2 - 10x + 7$ $\underset{-}{5x^2} \underset{+}{- 20x} \underset{-}{+ 40}$ $10x - 33$ So -10x + 33 has to be added	2 1 3 1

39.	Volume of cylinder = $=\pi r^2 h$ Volume of sphere $=\frac{4}{3}\pi r^3$ Cylinder: Radius r = 10 cm Raise in water level = h Sphere: Radius = 0.5 cm $=\frac{1}{2}$ cm  Volume of water raised in cylinder = 9000 × volume of sphere $\pi\times10\times10\times h=9000\times\frac{4}{3}\times\pi\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}$ $\not\pi\times\not10\times\not10\times h=\overset{30}{\not9\not0}\not0\not0\times\frac{\not4}{\not3}\times\not\pi\times\frac{1}{\not2}\times\frac{1}{\not2}\times\frac{1}{2}$ $h=15cm$ Rise in the level of water in vessel = 15 cm.	1 1 2
40.	For correct Given, to prove, Construction and figure For Correct proof Refer NCERT text book pg no. 124	½ x 4 =2 2