SUMMATIVE ASSESSMENT - III - 2016-2017
MATHEMATICS - PAPER I
(English Medium)
PRINCIPLE OF VALUATION

Class : IX

SECTION - I

1. For Ex : 0.52515345.........

   0.541656475..........

   Write any two irrational numbers. $2 \times \frac{1}{2} = 1$ Marks.

2. Let Neeraja contributed Amount $= x$

   Girija contributed Amount $= y$ say ½ Mark

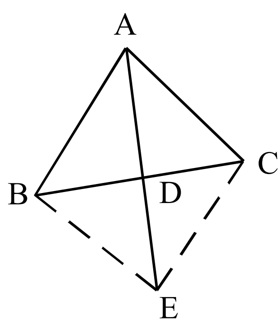
   Neeraja and Girija together contributed amount $= x + y = 300$.

3. If $x \leq 0$ (or) $x \geq 1$ then $x^2 \geq x$ 1 Mark

   (or)

   For every integer x, $x^2 \geq x$

4. Drawn figure 1 M



SECTION - II

5. Let smallest angle of parallelogram be $= x$

   One of the angle of Parallelogram $= 2x - 2y$

   Sum of angles of Parallelogram $= 360^0$

   $$x + 2x - 2y + x + 2x - 2y = 360^0$$

   $$6x - 48 = 360^0$$

   $$6x = 408^0$$

$$\Rightarrow x = \frac{408^0}{6} = 68^0$$

$\therefore$ angle of Parallelogram $x = 68^0$

$$f(x) = x^2 - x - 6$$

6. Let $g(x) = x^2 + 3x - 18$

$x - a$ is a factor of $f(x)$ and $g(x)$ then

$$f(a) = g(a)$$

$$\cancel{a}^2 - a - 6 = \cancel{a}^2 + 3a - 18$$

$$-a - 3a = -18 + 6$$

$$-4a = -12$$

$$\therefore a = \frac{-1\cancel{2}}{-\cancel{4}} = 3$$

7. If x is odd then $x = 2k + 1$. Where $k \in z$

($\because$ Def of odd numbers)

Squares on both sides

$$x^2 = (2k+1)^2$$

$$= 4k^2 + 4k + 1$$

$$= 2(2k^2 + 2k) + 1 = 2l + 1$$

$\therefore x^2$ is odd.

8. Dimensions of cubuid shaped olympic swimming pool are $l = 50$ m.

$b = 25$ m.

$h = 3$ m.

No. of litres swimming pool hold = Volume of cubuid

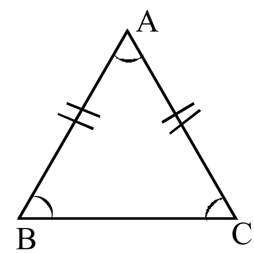
$= lbh$

$= 50 \times 25 \times 3 = 3750 \text{ m}^3$

9. In $\triangle$ ABC is Isosceless triangle

Let $\angle A$ is top vertex angle and $\angle B$ are base angles.

$\angle B$, $\angle C$ are base angles.



Let one of base angle = x say

$\therefore \angle B = x^0, \qquad \angle C = x^0$

$\angle A = 2(x+x) = 2\times 2x$

$= 4x$

$\therefore$ Sum of the angles = $4x + x + x = 6x$

$6x = 180^0$ ($\because$ Sum of INteri angles M triangle are 180)

$x = 30^0$

angles are $x^0 = 30^0$,

$x = 30^0$

$4x^0 = 120^0$

Exterior angles are $180^0 - 30^0$, $180^0 - 30^0$, $180^0 - 120^0$

$= 150^0, 150^0, 60^0.$

SECTION - III

10. a) $x = \dfrac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$

Multiply numerator and denominator by Rationlise facter of $\sqrt{3}-\sqrt{2}$ is $\sqrt{3}+\sqrt{2}$

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

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

$$= \frac{3+2+2\sqrt{6}}{3-2} = 5+2\sqrt{6}$$

$$y = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$$

Multiply numerator and denominator by Rationlise factor of

$\sqrt{3}+\sqrt{2}$ is $\sqrt{3}-\sqrt{2}$

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

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

$$= \frac{3+2-2\sqrt{6}}{3-2} = 5-2\sqrt{6}$$

$$\therefore x^2 + y^2 = \left(5+2\sqrt{6}\right)^2 + \left(5-2\sqrt{6}\right)^2$$

$$= 25 + 2\cancel{0}\sqrt{6} + 24 + 25 - 2\cancel{0}\sqrt{6} + 24$$

$$= 98$$

b) Let $p(x) = 2x^3 + 3x^2 + ax + b$

When P(x) divided by $x-2$ leaves remainder is 2 ½ Mark

$$\therefore p(2) = 2$$

$$p(2) = 2(2)^3 + 3(2)^2 + a(2) + b = 2$$

$$16 + 12 + 2a + b = 2$$

$$28 + 2a + b = 2 \qquad \text{1 Mark}$$

$$2a + b = 2 - 28$$

$$2a + b = -26 \qquad \text{-----(1)}$$

when $P(x)$ divided by $x+2$ leaves remainder is -2 ½ Mark

$$\therefore p(-2) = -2$$

$$p(-2) = 2(-2)^3 + 3(-2)^2 + a(-2) + b = -2$$

$$-16 + 12 - 2a + b = -2$$

$$-4 - 2a + b = -2 \qquad \text{1 Mark}$$

$$-2a + b = -2 + 4$$

$$-2a + b = 2 \quad \text{----- (2)}$$

Solve (1) & (2)

$$2\cancel{a} + b = -26$$

Add $\underline{-2\cancel{a} + b = 2}$

$$2b = -24$$

$$\therefore b = -12 \qquad \text{1 Mark}$$

put $b = -12$ in (1)

$$2a + (-12) = -26$$

$$2a = -26 + 12$$

$$2a = -14$$

$$a = -7$$

$\therefore$ values of $a = -7$ and $b = -12$ 4 Marks

11. a) Diameter of the cylinder (d) = 5 cm

radius (r) = $\frac{d}{2} = \frac{5}{2}$ cm.

height (h) = $3\frac{1}{3} = \frac{10}{3}$ cm.

Metalic cylinder melted and cast into sphere then the volume of sphere = volume of cylinder.

$\therefore$ Volume of Sphere $= \frac{4}{3}\pi r^3$

$$= \frac{4}{3} \times \frac{22}{7} \times r^3$$

Volume of cylinder $= \pi r^2 h$

$$= \frac{22}{7} \times \frac{5}{2} \times \frac{5}{2} \times \frac{10}{3}$$

$$\therefore \frac{4}{3} \times \frac{22}{7} \times r^3 = \frac{22}{7} \times \frac{5}{2} \times \frac{5}{2} \times \frac{10}{3}$$

$$\therefore \quad r^3 = \frac{5}{2} \times \frac{5}{2} \times \frac{1\cancel{0}5}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{4}2}$$

$$r \times r \times r = \frac{5}{2} \times \frac{5}{2} \times \frac{5}{2}$$

$\therefore$ Radius of the sphere $= \frac{5}{2}$

$\therefore$ Diameter of the Sphere $\cancel{2} \times \frac{5}{\cancel{2}}$

$$= 5cm$$

b) Let $p(x) = x^3 - 23x^2 + 142x - 120$

Put $x = 1$ then $p(1) = 1^3 - 23(1)^2 + 142(1) - 120$

$$= 1 - 23 + 142 - 120$$

$$= 143 - 143 = 0$$

$\therefore$ $p(1) = 0$ then $(x-1)$ is a factor of $p(x)$

1 Mark

$\therefore$ Divide $p(x)$ by $x - 1$

$x - 1$ | $x^3 = 23x^2 + 142x = 120$ | $x^2 - 22x + 120$

$x^3 - x^2$

$-$ $+$

$- 22x^2 + 142x$

$- 22x^2 + 22x$

$+$ $-$

$120x - 120$

$120x - 120$

0

1 ½ Mark

$$x-1\left|x^3-23x^2+142x-120\right|x^2-22x+120$$

$$_{-}x^3 - _{+}x^2$$

$\therefore$ $x^3-23x^2+142x-120=(x-1)(x^2-22x+120)$

$x^2-22x+120=x^2-12x-10x+120$

$=x(x-12)-10(x-12)$ 1½ Mark

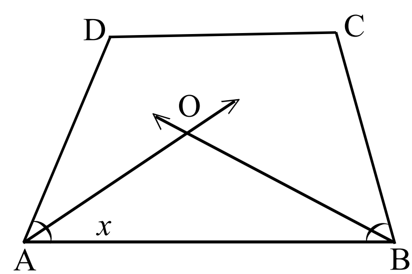
$=(x-10)(x-12)$

$\therefore$ $x^3-23x^2+142x-120=(x-1)(x-10)(x-12)$ 4 Marks

12. a) Given :

AB is Quadrileteral and bisection of

$\angle A$ and $\angle B$ meets at '0'.



R.T.P. : $\angle AOB=\frac{1}{2}(LC+LD)$

Proof: Let $\angle OAB=x,\ \angle OBA=y,$

In ΔAOB

$$\angle AOB+x+y=180^0$$

$$\angle AOB=180^0-(x+y)$$

$$=180^0-\left[\frac{LA}{2}+\frac{LB}{2}\right] \qquad \left(\begin{array}{l}\because Lx=\frac{LA}{2}\\ and\\ Ly=\frac{LB}{2}\end{array}\right)$$

$$=180^0-\frac{1}{2}\left[LA+LB\right] \text{ -----(1)}$$

In ABCD Quadrileteral, Sum of all angles M is 360^0.

$\therefore$ $\angle A+\angle B+\angle C+\angle D=360^0$

$\angle A+\angle B=360^0-(LC+LD)$

$$(1) \Rightarrow \angle AOB = 180^0 - \frac{1}{2}\left[360^0 - (LC + LD)\right]$$

$$= \cancel{180^0} - \cancel{180^0} + \frac{1}{2}(LC + LD)$$

$$\angle AOB = \frac{1}{2}\left[LC + LD\right]$$

Hence Proved

b) Let the radii of the right circular cones be r_1 and r_2

Vertical heights of cones be h_1 and h_2

Volumes of cones be v_1 and v_2

$\therefore$ Then volumes are equal then $v_1 = v_2$

$$\Rightarrow \cancel{\frac{1}{3}} \cancel{\pi} r_1^2 h_1 = \cancel{\frac{1}{3}} \cancel{\pi} r_2^2 h_2$$

$$\Rightarrow r_1^2 h_1 = r_2^2 h_2$$

$$\frac{r_1^2}{r_2^2} = \frac{h_2}{h_1}$$

$$\frac{r_1^2}{r_2^2} = \frac{2}{1} \qquad \left(\begin{array}{l} \because h_1 : h_2 = 1:2 \\ \dfrac{h_1}{h_2} = \dfrac{1}{2} \end{array}\right)$$

$$\left(\frac{r_1}{r_2}\right)^2 = \frac{2}{1}$$

$$\therefore \frac{r_1}{r_2} = \sqrt{\frac{2}{1}}$$

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

$$\therefore \; r_1 : r_2 = \sqrt{2} : 1$$

$\therefore$ Ratio's of radius $= \sqrt{2} : 1$

Hence proved

13. a) The equation is $3x + 2y + 6 = 0$

$$2y = -3x - 6$$

$$y = \frac{-3x-6}{2}$$

Table of solution

x	-4	-2	0	2
$y = \frac{-3x-6}{2}$	3	0	-3	-6
(x,y)	$(-4,3)$	$(-2,0)$	$(0,-3)$	$(-2,-6)$
Point	A	B	C	D

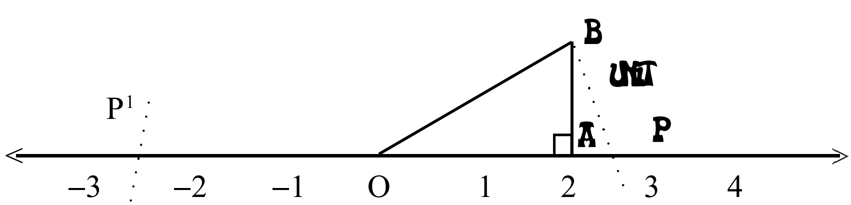
Plottms the points on the graph paper and join them to get a straight line as shown in the graph sheet. This line is required graph of the equation $3x + 2y + 6 = 0$

The straight line graph X - axis at $(-2, 0)$

Y - axis at $(0, -3)$

$\therefore$ Solution $x = -2,\ y = -3$

b)



Take OA = 2 units and AB = 1 unit $OA \perp AB$

$\triangle OAB$ right angle triangle

by the pythogarous theorm $OB^2 = OA^2 + AB^2$

$$= 2^2 + 1^2$$

$$= 4 + 1 = 5$$

$$OB = \sqrt{5}$$

Using compass with centre 'O' and radius OB draw an arc on the right side to 'O' interection the number line at the point 'P', and draw an arc on the left side to 'O' interseets then number line at point 'P''.

Now 'P' corresponds to $\sqrt{5}$

P' corresponds to $-\sqrt{5}$ on the number line.

PART - B

14.	D	28.	B
15.	C	29.	C
16.	D	30.	A
17.	B	31.	D
18.	A	32.	C
19.	B	33.	B
20.	D		
21.	C		
22.	C		
23.	D		
24.	B		
25.	D		
26.	A		
27.	D		