3

योग पूर्व पृष्ठ		पृष्ठ 3 के अंक		कुल अंक
	+	5	=	5

Ans-1→ Given - radius = 14m (since the horse is tied with a rope 14m long)

R.T.F. - Area

We know that

area of a circle $= \pi r^2$

$= \frac{22}{7} \times (14)^2$

$= \frac{22}{7} \times 14 \times 14$

$= 44 \times 14$

$\therefore$ area $= \underline{616\ m^2}$

$\therefore$ the horse can graze the grass in $\underline{616\ m^2}$ area.

B
S
E
M
P

Ans-2→ $= \frac{x^2-1}{x+2} \times \frac{3x+1}{x^2-8}$

$= \frac{(x^2-1)(3x+1)}{(x+2)(x^2-8)}$

$= \frac{x^2(3x+1)-1(3x+1)}{x(x^2-8)+2(x^2-8)}$

$= \frac{3x^3+x^2-3x-1}{x^3-8x+2x^2-16}$

$= \frac{3x^3+x^2-3x-1}{x^3+2x^2-8x-16}$ (Ans

5

पृष्ठ के अंकों का योग

④ 4 + 4 = 8

योग पूर्व पृष्ठ | पृष्ठ 4 के अंक | कुल अंक

Ans-3 → Let the mean proportional of 9 and 81 be x

$\Rightarrow \therefore 9 : x :: x : 81$

$\Rightarrow \frac{9}{x} = \frac{x}{81}$

$\Rightarrow x^2 = 9 \times 81$

$\Rightarrow x = \sqrt{9 \times 9 \times 9}$

$\Rightarrow \cancel{x = \pm 9\sqrt{9}}$

$\Rightarrow x = \sqrt{729}$

$\Rightarrow x = \pm 27$ (Ans)

$\therefore$ the mean proportional of 9 and 81 is ± 27.

Ans-4 Given equation → $x^2 + 5x + 8 = 0$

Standard equation → $ax^2 + bx + c = 0$

Comparing the given equation with the standard equation we get

$a = 1, \ b = 5, \ c = 8$

We know that

$D = b^2 - 4ac$ (where D = discriminant)

$D = (5)^2 - 4 \times 1 \times 8$

$D = 25 - 32$

$D = -7$ (Ans)

$\therefore$ the discriminant of $x^2 + 5x + 8 = 0$ is -7

Ans-5 → Cyclic Quadrilateral → Any quadrilateral inscribed in a circle in such a way that it has all its vertices lying on circumference is called a cyclic quadrilateral.

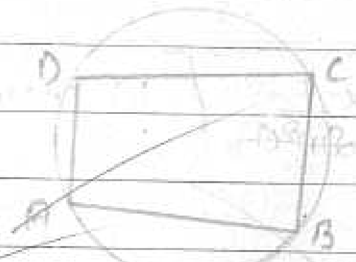
BSEMP

4

पृष्ठ के अंकों का योग

5

8	+	6	=	14
योग पूर्व पृष्ठ		पृष्ठ 5 के अंक		कुल अंक



In this figure □ABCD is a cyclic quadrilateral.

Speciality - The speciality of cyclic quadrilateral is that its opposite angles are supplementory. In the above figure:-

$\angle A + \angle C = 180^\circ$ --- ①

$\angle B + \angle D = 180^\circ$ --- ②

Ans-6)

Steps of construction (circumcentre)

1) Draw a triangle ABC of any measurement with the scale and rounder.

2) Draw perp. bisectors xy and PQ of any two sides say AC and BC. Let them intersect at O.

3) With O as centre and radius = OA or OB or OC we draw a circle which touches the vertices of $\triangle ABC$.

Ans-7 →

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

Show $0^\circ \le \theta \le 90^\circ$

LHS

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

$= (1-\cos^2\theta)(1+\cot^2\theta)$ $[\because (a-b)(a+b) = a^2-b^2)$

$= \sin^2\theta \times \operatorname{cosec}^2\theta$ $[\because 1-\cos^2\theta = \sin^2\theta$

$\because 1+\cot^2\theta = \operatorname{cosec}^2\theta]$

BSEMP

6

के अंकों का योग

(6) 15 + 4 = 18

योग पूर्व पृष्ठ पृष्ठ 6 के अंक कुल अंक

$= \cancel{\sin^2\theta} \times \frac{1}{\cancel{\sin^2\theta}}$ $\left[\because \operatorname{cosec}\theta = \frac{1}{\sin\theta}\right]$

$= 1$

$= RHS$

$\therefore LHS = RHS$

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

Hence proved

Ans-8 → $\sin(90^\circ-\theta)\cos\theta + \cos(90^\circ-\theta)\sin\theta = 1$

जबकि $0^\circ \leq \theta \leq 90^\circ$

LHS

$= \sin(90^\circ-\theta)\cos\theta + \cos(90^\circ-\theta)\sin\theta$

$= \cos\theta\times\cos\theta + \sin\theta\times\sin\theta$ $[\because \sin(90-\theta) = \cos\theta$, $\cos(90-\theta) = \sin\theta]$

$= \cos^2\theta + \sin^2\theta$ $[\because \sin^2\theta + \cos^2\theta = 1]$

$= 1$

$= RHS$

$\therefore LHS = RHS$

$\therefore \sin(90^\circ-\theta)\cos\theta + \cos(90^\circ-\theta)\sin\theta = 1$

BSEMP

4

पृष्ठ के अंकों का योग

Ans 9 → Following are the two properties of median.

1. It is easy to compute and understand.
2. Unlike mean it is not adversely ~~affected~~ affected by the extreme values.

7 $\boxed{18} + \boxed{1} = \boxed{19}$

गत पूर्व पृष्ठ पृष्ठ 7 के अंक कुल अंक

Ans-10 → **Given** - mean of 8, 10, 5, 15, 13 and x is 10

To find - value of x

We know that

$$\bar{x} = \Sigma x_i \times \frac{1}{n}$$

$n = 7$

$$\therefore \bar{x} = \frac{8+10+5+15+13+x}{7}$$

$$\Rightarrow 10 = \frac{51+x}{7}$$

$\Rightarrow 70 = 51+x$

$\Rightarrow x = 70-51$

$\Rightarrow x = 19$ --- (1)

$\therefore$ value of $x = 19$

B S E M P

Ans-11 → **Given Equation** → $6x^2 - 11x \pm 35$

Standard Equation → ax^2+bx+c

Comparing the given equation with the standard equation, we get :-

$a = 6, \; b = -11, \; c = -35$

We know that

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$= \frac{-(-11) \pm \sqrt{(-11)^2 - 4\times6\times(-35)}}{2\times6}$$

1

पृष्ठ के प्राप्तांक

(8) 19 + 3 = 22

योग पूर्व पृष्ठ | पृष्ठ 8 के अंक | कुल अंक

$= \frac{11 \pm \sqrt{121+840}}{12}$

$= \frac{11 \pm \sqrt{961}}{12}$

$= \frac{11 \pm 31}{12}$

By taking (+) sign $\Rightarrow = \frac{11+31}{12}$

$= \frac{42}{12}$ $\frac{21}{6}$ $\frac{7}{2}$

$x = \frac{7}{2}$

By taking (−) sign $= \frac{11-31}{12}$

$= \frac{-20}{12}$ $\frac{5}{3}$

$x = \frac{-5}{3}$

Sol $\{x = -5/3, \; x = 7/2\}$

Ans. 12 $\Rightarrow$

$\Rightarrow [5x - 3y = 1] \times 2$ --- (1)

$\Rightarrow [2x + 5y = 19] \times 5$ --- (2)

Multiplying 2 to eq (1) and 5 to eq (2) we get

$\Rightarrow 10x - 6y = 2$

$\Rightarrow 10x + 25y = 95$

(−) (−) (−) (By subtracting)

$-31y = -93$

$y = \frac{93}{31}$

$y = 3$

B S E M P

3

पृष्ठ के अंकों का योग

⑨ 22 + 6 = 28

योग पूर्व पृष्ठ | पृष्ठ 9 के अंक | कुल अंक

By substituting the value of y in eq(1)

$\Rightarrow 5x - 3(3) = 1$

$\Rightarrow 5x - 9 = 1$

$\Rightarrow 5x = 1 + 9$

$\Rightarrow x = 10/5$

$\Rightarrow x = 2$

Sol $\{x = 2, y = 3\}$

Ans 13-12 $\rightarrow$ $cx + 3y = c - 3$

$12x + cy = c$

$a_1 = c, \quad b_1 = 3, \quad c_1 = c - 3$

$a_2 = 12, \quad b_2 = c, \quad c_2 = c$

Since system has infinitely many solutions

$\therefore \frac{a_1}{a_2} = \frac{c_1}{c_2} = \frac{b_1}{b_2}$

By taking $\frac{a_1}{a_2} = \frac{b_1}{b_2}$

$\Rightarrow \frac{c}{12} = \frac{3}{c}$

$\Rightarrow c^2 = 12 \times 3$

$\Rightarrow c = \sqrt{36}$

$\Rightarrow c = \pm 6$

$\therefore$ value of $c = \pm 6$

BSEMP

के अंकों का योग

(10) 28 + 3 = 31

पिछला पृष्ठ पृष्ठ 10 के अंक कुल अंक

Ans-14 → $= a^2(b+c)+b^2(c+a)+c^2(a+b)+2abc$

$= a^2b+a^2c+b^2c+b^2a+c^2a+c^2b+2abc$

= Arranging the degree of a in des. order

$= a^2b+a^2c+b^2a+c^2a+2abc+b^2c+c^2b$

$= a^2(b+c)+a(b^2+c^2+2bc)+bc(b+c)$

$= a^2(b+c)+a(b+c)^2+bc(b+c)$ $[\because b^2+c^2+2bc=(b+c)^2]$

$= a^2(b+c)+a(b+c)(b+c)+bc(b+c)$

$= (b+c)[a^2+a(b+c)+bc]$

$= (b+c)(a^2+ab+ac+bc)$

Arranging the degree of b in des. order

$= (b+c)(ab+bc+a^2+ac)$

$= (b+c)(b(a+c)+a(a+c))$

$(b+c)(a+c)(a+b)$

$= (a+b)(b+c)(c+a)$

B S E M P

Ans-15 → Given → volume $= v$

length $= a$

breadth $= b$

height $= c$

wholesurface $= s$

3

RTP → $\frac{1}{v} = \frac{2}{s}\left[\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right]$

Proof – LHS

$= \frac{1}{v}$

RHS

$= \frac{2}{s}\left[\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right]$

$$= \frac{2}{S}\left[\frac{bc+ac+ab}{abc}\right]$$

$$= \frac{2}{S}\left[\frac{ab+bc+ac}{abc}\right]$$

$$= \frac{2(ab+bc+ac)}{S(abc)}$$

$$= \frac{\cancel{S}}{\cancel{S}(abc)} \quad [\because 2(ab+bc+ac) = S \{\text{whole surface}\}]$$

$$= \frac{1}{abc}$$

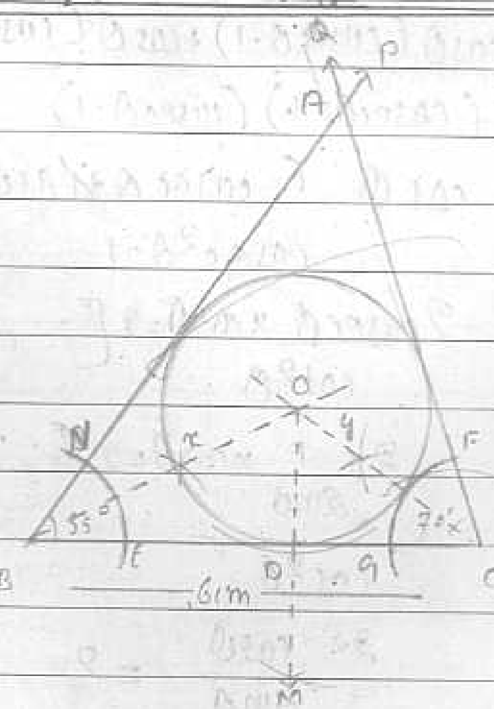
$$= \frac{1}{V} \quad [\because V = abc]$$

$\therefore$ LHS = RHS

Hence Proved

BSEMP

Ans-16(b)



Steps of Construction →

(1) Draw a ΔABC in such a way that BC = 6cm $\angle B = 55°$ and $\angle C = 70°$

3

अंकों का योग

(12) 34 + 3 = 37

योग पूर्व पृष्ठ | पृष्ठ 12 के अंक | कुल अंक

(2) Draw angle bisectors of any two angles say $\angle B$ and $\angle C$. Bx is bisector of $\angle B$ and CY is bisector of $\angle C$. Let them intersect at O.

(3) Draw $OM \perp BC$ which intersects BC at O.

(4) With O as centre and radius = OD draw a circle.

Ans-17 ->

$$\frac{\cos\theta}{\operatorname{cosec}\theta+1} + \frac{\cos\theta}{\operatorname{cosec}\theta-1} = 2$$

For $0^\circ < \theta < 90^\circ$

$$\Rightarrow \frac{\cos\theta}{\operatorname{cosec}\theta+1} + \frac{\cos\theta}{\operatorname{cosec}\theta-1} = 2$$

$$\Rightarrow \frac{\cos\theta(\operatorname{cosec}\theta-1)+\cos\theta(\operatorname{cosec}\theta+1)}{(\operatorname{cosec}\theta+1)(\operatorname{cosec}\theta-1)} = 2$$

$$\Rightarrow \frac{\cos\theta(\operatorname{cosec}\theta\cancel{-1}+\operatorname{cosec}\theta\cancel{+1})}{\operatorname{cosec}^2\theta-1} = 2 \quad [\because (a+b)(a-b) = a^2-b^2]$$

$$\Rightarrow \frac{2\operatorname{cosec}\theta\times\cos\theta}{\cot^2\theta} = 2 \quad [\because \operatorname{cosec}^2\theta-1=\cot^2\theta]$$

$$\Rightarrow \frac{2\times\frac{1}{\sin\theta}\times\cos\theta}{\cot^2\theta} = 2 \quad [\because \operatorname{cosec}\theta = \frac{1}{\sin\theta}]$$

$$\Rightarrow \frac{2\times\frac{\cos\theta}{\sin\theta}}{\cot^2\theta} = 2$$

$$\Rightarrow \frac{2\cot\theta}{\cot^2\theta} = 2 \quad [\because \frac{\cos\theta}{\sin\theta} = \cot\theta]$$

BSEMP

7

पृष्ठ के अंकों का योग

$\Rightarrow \frac{2}{\cot\theta} = 2$

$\Rightarrow 2\cot\theta = 2$

$\Rightarrow \cot\theta = \frac{2}{2}$

$\Rightarrow \cot\theta = 1$

$\Rightarrow \because \cot 45^\circ = 1$

$\Rightarrow \therefore \theta = 45^\circ$

$\theta = 45^\circ$ (Ans)

BSEMP

Ans-18:- $(\sec\theta - \tan\theta)^2 = \frac{1-\sin\theta}{1+\sin\theta}$

तब $0^\circ \leq \theta \leq 90^\circ$

LHS

$= (\sec\theta - \tan\theta)^2$

$= \left(\frac{1}{\cos\theta} - \frac{\sin\theta}{\cos\theta}\right)^2$ $\left[\because \sec\theta = \frac{1}{\cos\theta} \text{ and } \tan\theta = \frac{\sin\theta}{\cos\theta}\right]$

$= \left(\frac{1-\sin\theta}{\cos\theta}\right)^2$

$= \frac{(1-\sin\theta)^2}{\cos^2\theta}$

$= \frac{(1-\sin\theta)^2}{1-\sin^2\theta}$ $[\because \cos^2\theta = 1-\sin^2\theta]$

$= \frac{\cancel{(1-\sin\theta)}(1-\sin\theta)}{\cancel{(1-\sin\theta)}(1+\sin\theta)}$ $[\because a^2-b^2 = (a+b)(a-b)]$

$= \frac{1-\sin\theta}{1+\sin\theta}$ = RHS $\therefore$ LHS = RHS

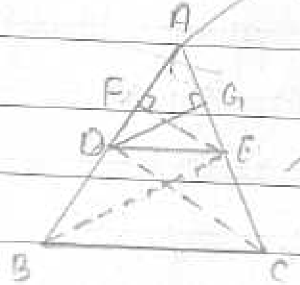
4

पृष्ठ के अंकों का योग

Ans-19 Thales Theorem →

In a triangle a line drawn parallel to one of its sides divides the other two sides in the same ratio.

Figure →



Given → ΔABC, $DE \parallel BC$

RTP – $\frac{AD}{DB} = \frac{AE}{EC}$

Const → We draw $DG \perp AE$ and $EF \perp AD$ Also join BE and CD.

Proof → Since ΔBDE and ΔCDE are on the same base BC and between same parallel $DE \parallel BC$.

$\therefore$ ar ΔBDE = ar ΔCDE ---① ($\because$ Triangles on the same base and between same parallel are equal in area)

We know that

$\frac{\text{ar}\,\Delta ADE}{\text{ar}\,\Delta BDE} = \frac{\frac{1}{2} \times EF \times AD}{\frac{1}{2} \times EF \times BD}$ [area of Δ axiom]

$\frac{\text{ar}\,\Delta ADE}{\text{ar}\,\Delta BDE} = \frac{AD}{BD}$ ---②

Also,

$\frac{\text{ar}\,\Delta AED}{\text{ar}\,\Delta CED} = \frac{\frac{1}{2} \times DG \times AE}{\frac{1}{2} \times DG \times EC}$ [area of Δ axiom]

BSEMP

4

पृष्ठ के अंकों का योग

$$\frac{ar\triangle AED}{ar\triangle CED} = \frac{AE}{EC} \quad ---- (3)$$

from eq (1), (2) and (3)

$$\frac{AB}{BD} = \frac{AE}{EC}$$

Hence proved

Ans-20 Let the numerator of the fraction be x
denominator = y

According to 1st condition

$$\Rightarrow \frac{x-2}{y+3} = \frac{1}{4}$$

$\Rightarrow$ $y+3 = 4(x-2)$

$\Rightarrow$ $y+3 = 4x-8$

$\Rightarrow$ $4x-y = 3+8$

$\Rightarrow$ $4x-y = 11$ ---(1)

According to second condition

$$\Rightarrow \frac{x+6}{3y} = \frac{2}{3}$$

$\Rightarrow$ $3(x+6) = 6y$

$\Rightarrow$ $3x+18 = 6y$

$\Rightarrow$ $3x-6y = -18$ ---(2)

$\Rightarrow$ $[4x-y = 11] \times 3$

$\Rightarrow$ $[3x-6y = -18] \times 4$

$\Rightarrow$ $12x - 3y = 33$

$\Rightarrow$ $\underset{(-)}{12x} \underset{(+)}{- 24y} = \underset{(+)}{-72}$ (By subtracting)

$21y = 105$

$$y = \frac{105}{21}$$

BSEMP

$y=5$

Substituting the value of y in eq (1)

$\Rightarrow 4x - y = 11$

$\Rightarrow 4x - 5 = 11$

$\Rightarrow 4x = 11+5$

$\Rightarrow x = \frac{16}{4}$

$\Rightarrow x = 4$

Sol $\{x=4, y=5\}$

$\therefore$ numerator = 4

denominator = 5

fraction = $\frac{4}{5}$ (ANS)

Ans-21 Given - Total surface area of cylinder = $462 cm^2$

$\frac{1}{3}$ Total surface area = curved surface

To find - volume

Curved surface = $\frac{1}{3}$ Total surface area

$= \frac{1}{3} \times 462$

Curved surface = $154 cm^2$

We know that

Total surface area - curved surface area = area of top + area of base.

$\Rightarrow 462 - 154 = 2\pi r^2$

$\Rightarrow 308 = 2 \times \frac{22}{7} \times r^2$

BSEMP

पृष्ठ के अंकों का योग

(17) 50 + 5 = 55

योग पूर्व पृष्ठ | पृष्ठ 17 के अंक | कुल अंक

$\Rightarrow r^2 = \frac{\cancel{308}^{154} \times 7}{\cancel{2} \times \cancel{22}}$

$\Rightarrow r^2 = 49$

$\Rightarrow r = \sqrt{49}$

$\Rightarrow r = 7$ cm.

Curved surface area $= 2\pi rh$

$\Rightarrow 154 = 2 \times \frac{22}{7} \times 7 \times h$

$\Rightarrow h = \frac{154}{2 \times 22}$

$\Rightarrow h = \frac{7}{2}$ cm.

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

$= \frac{22}{7} \times 7 \times 7 \times \frac{7}{2}$

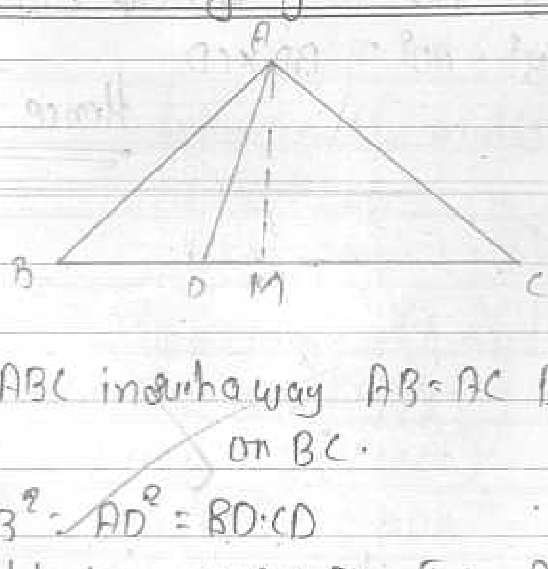
$= 77 \times 7$

$= 539$ cu.cm. (Ans)

volume of cylinder $= 539$ cu.cm

Ans-22

5



Given → ΔABC in such a way $AB = AC$ D is any point on BC.

RTP – $AB^2 - AD^2 = BD \cdot CD$

Const – We draw $AM \perp BC$ Join AD.

BSEMP

पृष्ठ के अंकों का योग

Proof → In ΔABM and ΔACM

$AB = AC$ (Given)

$\angle ABC = \angle ACB$ (Angle opp. to equal side)

$\angle AMB = \angle AMC$ (Each $90°$)

By SAS cong. condition

$\Rightarrow \Delta ABM \cong \Delta ACM$

$\Rightarrow BM = CM$ (C.P.C.T.) ---- ①

In ΔAMB

$\Rightarrow AB^2 = BM^2 + AM^2$ (By pythagorus theorem) -- ②

In ΔAMD

$\Rightarrow AD^2 = DM^2 + AM^2$ (By pythagorus theorem) -- ③

Subtracting eq ③ from eq ②

$\Rightarrow AB^2 - AD^2 = (BM^2 + AM^2) - (DM^2 + AM^2)$

$\Rightarrow AB^2 - AD^2 = BM^2 \cancel{+AM^2} - DM^2 \cancel{-AM^2}$

$\Rightarrow AB^2 - AD^2 = BM^2 - DM^2$

$\Rightarrow AB^2 - AD^2 = (BM - DM)(BM + DM)$

$\Rightarrow AB^2 - AD^2 = BD\,(CM + DM)$ ($\because BM = CM$)

$\Rightarrow AB^2 - AD^2 = BD \times CD$

Hence Proved

4

Ao23 →

Given - m PQ subtends $\angle POQ$ at centre R is any point on m PQ

RTP → $2\angle PRQ = \angle POQ$

Const → Join OR produce it to M also join OP and OQ

Proof - Let $\angle PRO = \angle 1$, $\angle QRO = \angle 2$, $\angle RPO = \angle 3$, $\angle RQO = \angle 4$

$\angle POM = \angle 5$, $\angle QOM = \angle 6$

In ΔPOR

$\angle 5$ is an ext. angle

$\Rightarrow \therefore \angle 1 + \angle 3 = \angle 5$ (ext. $\angle$ theorem) --- (1)

Also, OP = OR (radius)

$\therefore \angle 1 = \angle 3$ (angle opp. to equal sides) -- (2)

from eq (1) and (2)

$\Rightarrow \angle 1 + \angle 1 = \angle 5$

$\Rightarrow 2\angle 1 = \angle 5$ --- (3)

In ΔQOR

$\angle 6$ is an ext. angle

$\Rightarrow \therefore \angle 2 + \angle 4 = \angle 6$ (ext $\angle$ theorem) --- (4)

Also OQ = OR (radius)

4

$\therefore \angle 2 = \angle 4$ (angle opp. to equal sides) -- (5)

from eq (4) and (5)

$\Rightarrow \angle 2 + \angle 2 = \angle 6$

$\Rightarrow 2\angle 2 = \angle 6$ --- (6)

4

By adding eq (3) and eq (6)

$\Rightarrow \angle 5 + \angle 6 = 2\angle 1 + 2\angle 2$

$\Rightarrow \angle POQ = 2(\angle 1 + \angle 2)$

$\Rightarrow \angle POQ = 2\angle PRQ$

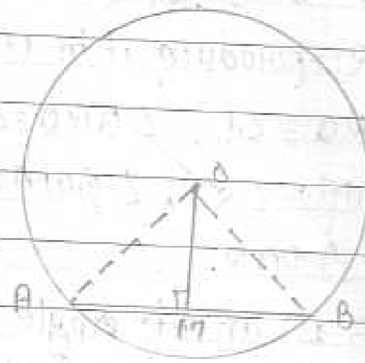
$\Rightarrow 2\angle PRQ = \angle POQ$ (Hence proved)

20

62 + 4 = ~~66~~ 67

योग पूर्व पृष्ठ   पृष्ठ 20 के अंक   कुल अंक

Ans-24



Given- AB is a chord of circle C(O,r) OM is drawn from centre in such a way OM⊥AB.

RTP- AM=MB

Const- Join OA and OB

Proof- In △OMA and △OMB

OA=OB (radius)

∠OMA = ∠OMB (Each 90°)

OM=OM (common)

By RHS cong. theorem we get

AM=BM (C.P.C.T.)

∴ a perpendicular from centre of a circle to a chord bisects the chord.

Hence proved.

4

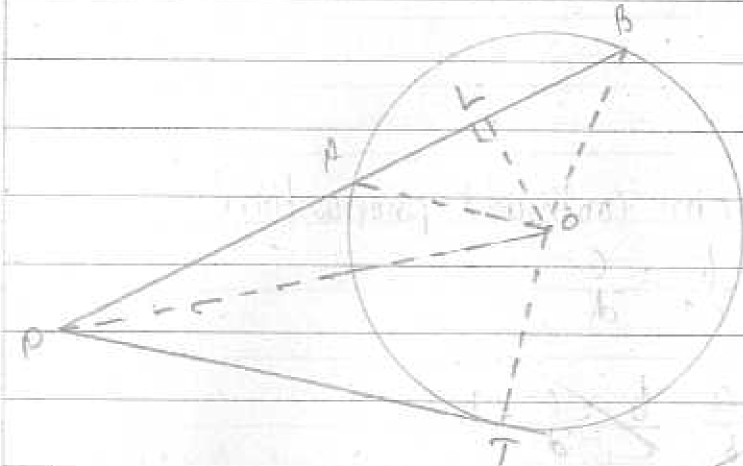
4

पृष्ठ के अंकों का योग

Ans-25

P.T.O.

Ans-25



Given - PAB is secant to a circle intersecting the circle at A and B. PT is tangent with point of contact T.

RTP - $PA \times PB = PT^2$

Const - we draw OL ⊥ AB Join OP, OA and OB and OT

Proof - since OL ⊥ AB (By construction)

$\therefore AL = BL$

or ~~AM = BM~~ (a line drawn perpendicular from centre to chord bisects the chord) --(1)

LHS

$= PA \times PB$

$= (PL - AL)(PL + BL)$

$= (PL - AL)(PL + AL)$ [$\because AL = BL$]

$= PL^2 - AL^2$

$= (OP^2 - OL^2) - AL^2$ [$\because$ In ΔPOL $PL^2 = OP^2 - OL^2$]

$= OP^2 - (OL^2 + AL^2)$

$= OP^2 - OA^2$ [$\because$ In ΔOAL $OL^2 + AL^2 = OA^2$]

$= OP^2 - OT^2$ [$\because OA = OT$ (radius)]

$= PT^2$ [$\because$ In ΔPOT $OP^2 - OT^2 = PT^2$]

5

अंकों का योग

(22) 79 + 5 = 77

योग पूर्व पृष्ठ   पृष्ठ 22 के अंक   कुल अंक

= RHS

$\therefore LHS = RHS$

Ans-26 - $\because$ a, b, c, d are in continued proportion

$\therefore \frac{a}{b} = \frac{b}{c} = \frac{c}{d}$

Let $\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = k$

$\therefore c = dk$

$b = ck$

$b = dk \cdot k$

$b = dk^2$

$a = bk$

$a = dk^2 \cdot k$

$a = dk^3$

LHS

$= \frac{a^2 + ab + b^2}{b^2 + bc + c^2}$

$= \frac{(dk^3)^2 + dk^3 \cdot dk^2 + (dk^2)^2}{(dk^2)^2 + dk^2 \cdot k + (dk)^2}$

$= \frac{d^2k^6 + d^2k^5 + d^2k^4}{d^2k^4 + d^2k^3 + d^2k^2}$

$= \frac{\cancel{d^2}k^4 \cancel{(k^2+k+1)}}{\cancel{d^2}k^2 \cancel{(k^2+k+1)}}$

$= k^{4-2}$

$= k^2$

5

पृष्ठ के अंकों का योग

BSEMP

RHS

$= \frac{a}{c}$

$= \frac{dk^3}{dk}$

$= k^{3-1}$

$= k^2$

$\therefore$ LHS = RHS

$\therefore \frac{a^2+ab+b^2}{b^2+bc+c^2} = \frac{a}{c}$

Ans-27 Let the bredth of the plot $= x$

length $= x+8$

According to given condition

$\Rightarrow l \times b = \text{Area}$

$\Rightarrow x(x+8) = 308$

$\Rightarrow x^2 + 8x = 308$

$\Rightarrow x^2 + 8x - 308 = 0$

Comparing this equation with the standard quadratic equatic i.e. $ax^2+bx+c=0$

we get $a=1,\ b=8,\ c=-308$

We know that

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$= \frac{-8 \pm \sqrt{64-4\times1(-308)}}{2\times1}$$

के अंकों का योग

$$= \frac{-8 \pm \sqrt{64+1232}}{2}$$

$$= \frac{-8 \pm \sqrt{1296}}{2}$$

$$= \cancel{-8 \pm 36} \quad \frac{-8 \pm 36}{2}$$

By taking (+) sign $\frac{-8+36}{2}$

$= \frac{28}{2}$

$x = 14$ m

By taking (−) sign $= \frac{-8-36}{2}$

$= \frac{-44}{2}$

$x = -22$

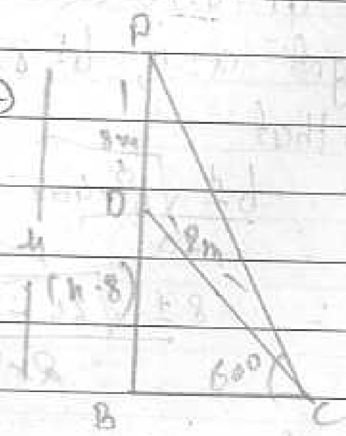
Since we reject $x = -22$ which does not satisfy the condition hence our only solution is $x = 14$

$\therefore$ bredth $= 14$m

length $= 14 + 8$

$= 22$m

08A0289



(25) 82 + 5 = 87

योग पूर्व पृष्ठ | पृष्ठ 25 के अंक | कुल अंक

BSEMP

In the above figure
Let length of ladder = DC
pole = AB
Let height of pole = h
In $\triangle ABC$
$\angle ABC = 90^\circ$
$\angle ACB = 60^\circ$
$\therefore \angle BAC = 30^\circ$ (Angle sum property of a $\triangle$)
But DA = DC (both 8m)
$\therefore \angle BAC = \angle ACD$ (angle opp. to equal side)
But $\angle BAC = 30^\circ$
$\therefore \angle ACD = 30^\circ$
$\angle ACD + \angle BCD = 60^\circ$
$30^\circ + \angle BCD = 60^\circ$
$\angle BCD = 60^\circ - 30^\circ$
$\angle BCD = 30^\circ$ ($\because \angle BCA = 60^\circ$)
In $\triangle BCD$
$\Rightarrow \sin 30^\circ = \frac{BD}{DC}$
$\Rightarrow \frac{1}{2} = \frac{h-8}{8}$
$\Rightarrow 8 = 2h - 16$
$\Rightarrow 2h = 8 + 16$
$\Rightarrow 2h = 24$
$\Rightarrow h = 24/2$
$\Rightarrow h = 12$ m. $\therefore$ height of pole = 12m.

5

के अंकों का योग

(26) $\boxed{84}$ + $\boxed{6}$ = $\boxed{90}$ 92.5

87

अंक पूर्व पृष्ठ पृष्ठ 26 के अंक कुल अंक

Ans-29 Given - ~~radius~~ diameter of hemispherical paper weight = 4cm

$r = \frac{d}{2}$

$r = \frac{4}{2}$

$r = 2cm.$

volume of hemisphere $= \frac{2}{3}\pi r^3$

$= \frac{2}{3}\pi\ 2\times2\times2$

$= \frac{16}{3}\pi$ cu cm.

Diameter of air bubble = 2cm

$r = \frac{d}{2}$

$= \frac{2}{2}$

$= 1cm.$

volume of air bubble $= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi\ 1\times1\times1$

$= \frac{4}{3}\pi$ cu.cm.

$\boxed{6}$

Since the hemispherical paper weight contains the air bubble ∴

volume of material = volume of hemispherical paper weight - volume of air bubble

$= \frac{16}{3}\pi - \frac{4}{3}\pi$

$= \frac{16\pi - 4\pi}{3}$

BSEMP

27

योग पूर्व पृष्ठ		पृष्ठ 27 के अंक		कुल अंक
~~90~~	+		=	92

$= \frac{12\pi}{3}$

$= 4\pi$ cu.cm.

$= \frac{4 \times 22}{7}$

$= \frac{88}{7}$

$= 12.57$ cu.cm.

$\therefore$ the volume of material of the paper weight is 12.57 cu.cm.

B S E M P

Ans.30

Class interval	Frequency f_i	mid value x_i	$u_i = \frac{x_i - a}{h}$ $a = 35$ $h = 10$	$f_i \times u_i$
0-10	4	5	-3	-12
10-20	6	15	-2	-12
20-30	3	25	-1	-3
30-40	2	35	0	0
40-50	2	45	1	2
50-60	5	55	2	10
60-70	8	65	3	24
Total	30			+9

$\bar{u} = \frac{\sum f_i u_i}{\sum f_i}$

$= \frac{\cancel{9}\,3}{\cancel{30}\,10}$

$= 0.3$

$\bar{x} = a + h\bar{u}$

$= 35 + (10 \times 0.3)$

पृष्ठ के अंकों का योग

$\bar{x} = 35 + 3$

$= 38$

$\therefore$ the arithmetic mean $= 38$

6

B
S
E
M
P

6

पृष्ठ के अंकों का योग

$\frac{99}{100}$

अंकों का योग