Pre-board (2025-26) Maths Class - 10

Solutions

① $3x - 2y = 5$

and, $2x + y = 3$

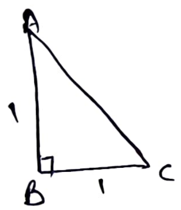
$\frac{a_1}{a_2} = \frac{3}{2}$; $\frac{b_1}{b_2} = \frac{-2}{1}$; $\frac{c_1}{c_2} = \frac{5}{3}$

$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

So the given equation has one solution (b).

अतः दिए हुए समीकरण के एक हल है।

②

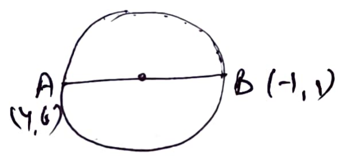


$\tan\theta = \frac{AB}{BC}$

$\Rightarrow \tan\theta = \frac{1}{1} = \tan 45^\circ$

$\Rightarrow \theta = 45^\circ$ (c)

③ $A(4, 6)$, $B(-1, 1)$



Radius of the circle
वृत्त की त्रिज्या $= \frac{1}{2} AB$

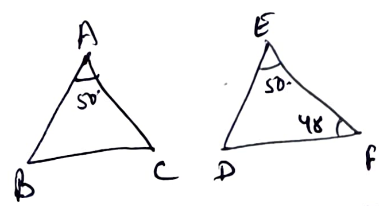
$= \frac{1}{2}\sqrt{(-1-4)^2 + (1-6)^2}$

$= \frac{1}{2}\sqrt{(-5)^2 + (-5)^2}$

$= \frac{1}{2}\sqrt{25+25} = \frac{1}{2}\sqrt{50} = \frac{1}{2}\sqrt{25 \times 2}$

$= \frac{5\sqrt{2}}{2}$ units (b)

④



In $\triangle ABC$ and $\triangle EDF$,

$\angle A = \angle E = 50^\circ$ and $\angle F = 48^\circ$

$\frac{AB}{AC} = \frac{ED}{EF}$

So, $\angle C = \angle F = 48^\circ$ (c)

(5) Ratio of the areas of two circles = 9 : 16
दो वृत्तों के क्षेत्रफलों का अनुपात

$$\pi r_1^2 : \pi r_2^2 = 9 : 16$$

$$\Rightarrow \frac{\cancel{\pi} r_1^2}{\cancel{\pi} r_2^2} = \frac{9}{16}$$

$$\Rightarrow \left(\frac{r_1}{r_2}\right)^2 = \left(\frac{3}{4}\right)^2$$

$$\Rightarrow \frac{r_1}{r_2} = \frac{3}{4}$$

Now, ratio of their circumference = $2\pi r_1 : 2\pi r_2$
उनकी परिधि का अनुपात

$$= \frac{\cancel{2\pi} r_1}{\cancel{2\pi} r_2}$$

$$= \frac{r_1}{r_2} = \frac{3}{4}$$

$$= 3 : 4 \quad (d)$$

(6) $\sin(\alpha + \beta) = 0$

We know that $\sin^2 A + \cos^2 A = 1$

$$\sin^2(\alpha + \beta) + \cos^2(\alpha + \beta) = 1$$

$$\Rightarrow (0)^2 + \cos^2(\alpha + \beta) = 1$$

$$\Rightarrow \cos^2(\alpha + \beta) = 1$$

$$\Rightarrow \cos(\alpha + \beta) = 1$$

$$\Rightarrow \frac{1}{\cos(\alpha + \beta)} = \frac{1}{1}$$

$$\sec(\alpha + \beta) = 1 \quad (b)$$

$\Rightarrow$

(7) Let $p(x) = x^2 - px - 18$

Since 6 is a zero of p(x)

चूंकि, 6, p(x) का शून्यक है।

$\therefore$ $p(6) = 0$

$\Rightarrow$ $(6)^2 - 6p - 18 = 0$

$\Rightarrow$ $36 - 6p - 18 = 0$

$\Rightarrow$ $18 - 6p = 0$

$\Rightarrow$ $-6p = -18$

$\Rightarrow$ $p = \frac{\cancel{-18}\,3}{\cancel{-6}}$

$\boxed{p = 3}$ (a)

(8) 7, 8, a, 11, 14

Arithmetic Mean = a

अंकगणितीय माध्य

$\Rightarrow$ $\frac{7+8+a+11+14}{5} = a$

$40 + a = 5a$

$\Rightarrow$ $40 = 5a - a$

$\Rightarrow$ $4a = 40$

$\Rightarrow$ $a = \frac{\cancel{40}\,10}{\cancel{4}}$

$\Rightarrow$ $\boxed{a = 10}$ (a)

(9) $5\sqrt{81} = 5\sqrt{3 \times 3 \times 3 \times 3}$

$= 5 \times 3 \times 3 = 45$ (c) a rational number

एक परिमेय संख्या

(10) $p = 2\tan^2\theta$ and $y = 1 + \sec^2\theta$

We know that $1 + \tan^2\theta = \sec^2\theta \Rightarrow 1 = \sec^2\theta - \tan^2\theta$

Now, $2y - p = 2(1 + \sec^2\theta) - 2\tan^2\theta$

$= 2 + 2\sec^2\theta - 2\tan^2\theta$

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

$= 2 + 2(1)$

$= 2 + 2 = 4$ (b)

(11) Let $A(0, 12)$, $B(0, 0)$, $C(5, 0)$

$AB = \sqrt{(0-0)^2 + (0-12)^2} = \sqrt{144} = 12$ units

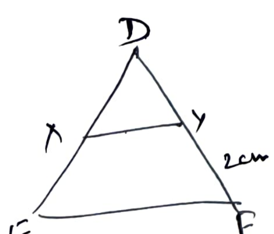
$BC = \sqrt{(5-0)^2 + (0-0)^2} = \sqrt{25} = 5$ units

$AC = \sqrt{(5-0)^2 + (0-12)^2} = \sqrt{25 + 144} = \sqrt{169} = 13$ units

Perimeter of the triangle $= AB + BC + AC$
त्रिभुज का परिमाप

$= 12 + 5 + 13 = 30$ units (a)

(12)



$XY \parallel EF$ & $FY = 2$cm

and $DE = 4EX$

$\Rightarrow DX + XE = 4EX$

$\Rightarrow DX = 4EX - XE$

$\Rightarrow DX = 3XE$ — (1)

In $\triangle DEF$,

$XY \parallel EF$

By BPT,

$\frac{DX}{XE} = \frac{DY}{YE}$

$\Rightarrow \frac{3\cancel{XE}}{\cancel{XE}} = \frac{DY}{2} \Rightarrow DY = 3 \times 2 = 6$ cm (d)

(13) $15, p, q, -3$ are in A.P.

$p - 15 = q - p = -3 - q$

Now, $p - 15 = q - p$

$\Rightarrow p - 15 - q + p = 0$

$\Rightarrow 2p - q - 15 = 0$ — (i)

$q - p = -3 - q$

$\Rightarrow q + 3 + q = p$

$\Rightarrow 2q + 3 = p$ — (ii)

from (i) & (ii),

$2(2q+3) - q - 15 = 0$

$\Rightarrow 4q + 6 - q - 15 = 0$

$\Rightarrow 3q - 9 = 0$

$\Rightarrow 3q = 9$

$\Rightarrow q = \cancel{\frac{9}{3}}^{3} = 3 \Rightarrow \boxed{q = 3}$

Putting the value of q in eq (i),

$2p - 3 - 15 = 0$

$\Rightarrow 2p - 18 = 0$

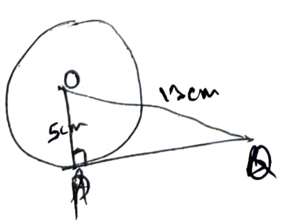
$\Rightarrow 2p = 18$

$\Rightarrow p = \cancel{\frac{18}{2}}^{9}$

$\Rightarrow \boxed{p = 9}$

Now, $p - q = 9 - 3 = 6$ (a)

(14)



By Pythagoras theorem,

$OQ^2 = OP^2 + PQ^2$

$\Rightarrow (13)^2 = (5)^2 + PQ^2$

$\Rightarrow 169 = 25 + PQ^2$

$\Rightarrow 169 - 25 = PQ^2$

$\Rightarrow 144 = PQ^2$

$\Rightarrow PQ = 12cm$ (c)

(15) Side, भुजा = 6 cm

diameter, व्यास = 6cm

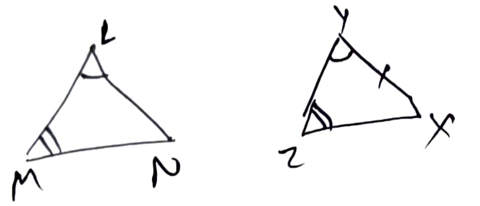
$r = \frac{6}{2} = 3cm$

Area of circle (वृत्त का क्षेत्रफल)

$= \pi r^2$

$= \pi (3)^2 = 9\pi \ cm^2$ (c)

(16)



$\angle Y = \angle L$

$\angle Z = \angle M$

and $XY = 2LN$

Ans - (b) similar but not congruent

समरूप लेकिन सर्वांगसम नहीं

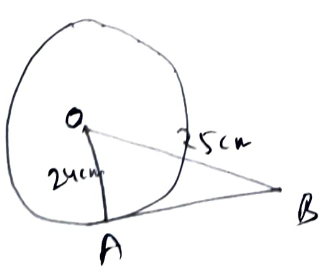
(17) Total bulbs = 15 defective bulbs + 150 good bulbs = 165 bulbs

कुल बल्ब = 15 खराब बल्ब + 150 ठीक बल्ब = 165 बल्ब

खराब बल्ब

P(defective bulbs) $= \frac{\cancel{15}\ \cancel{3}\ 1}{\cancel{165}\ \cancel{33}\ 11} = \frac{1}{11}$ (d)

(18)



By Pythagoras theorem,

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

$\Rightarrow 25^2 = 24^2 + AB^2$

$\Rightarrow 625 = 576 + AB^2$

$\Rightarrow 625 - 576 = AB^2$

$\Rightarrow 49 = AB^2$

$\Rightarrow 7^2 = AB^2$

$\Rightarrow AB = 7cm$ (c)

(19) (d) Assertion (A) is false but Reason (R) is true.

अभिकथन (A) असत्य है, लेकिन तर्क (R) सत्य है।

(20) (d)

(21) Let $p(x) = px^2 + 3x - 2 = 0$

Since, 2 is a root of $p(x)$

चूंकि, 2, $p(x)$ का एक मूल है

$$p(2) = 0$$

$$\Rightarrow p(2)^2 + 3(2) - 2 = 0$$

$$\Rightarrow 4p + 6 - 2 = 0$$

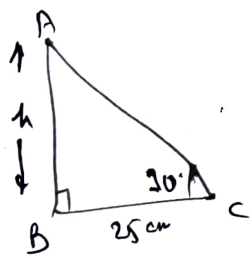
$$\Rightarrow 4p + 4 = 0$$

$$\Rightarrow 4p = -4$$

$$\Rightarrow p = \frac{-\cancel{4}}{\cancel{4}}$$

$$\Rightarrow \boxed{p = -1}$$

(22)



In ΔABC,

$$\frac{AB}{BC} = \tan 30^\circ$$

$$\Rightarrow \frac{h}{25} = \frac{1}{\sqrt{3}}$$

$$\Rightarrow h = \frac{25}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$\Rightarrow h = \frac{25\sqrt{3}}{3} \text{ cm}$$

(23) (A) If the 12^n, for any n, were to end with the digit zero, then it would be divisible by 5.
That is, the prime factorization of 12^n would contain the primes 5.
This is not possible because $12^n = (2^2 \times 3)^n$; so the only prime in the factorisation of 12^n is 2 and 3.
So, there is no natural number n for which 12^n ends with the digit zero.

यदि किसी n के लिए, संख्या 12^n शून्य पर समाप्त होगी तो वह 5 से विभाज्य होगी।
अर्थात 12^n के अभाज्य गुणनखण्डन में अभाज्य संख्या 5 आनी चाहिए।
यह संभव नहीं है क्योंकि $12^n = (2^2\times 3)^n$ है। इसी कारण, 12^n के गुणनखंडन में केवल अभाज्य संख्या 2 और 3 ही आ सकती है।
इसलिए, ऐसी कोई संख्या n नहीं है, जिसके लिए 12^n अंक 0 पर समाप्त होगी।

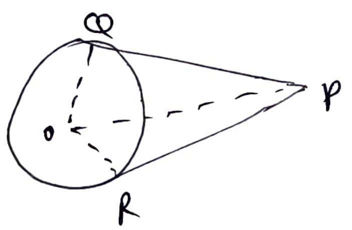
OR

(B) $2\times2\times3\times3\times3\times7\times11+51$

$= 3\times(2\times2\times3\times3\times7\times11+17)$

as it may be written as product of other numbers.
therefore, it is a composite number.

(24)



Given: A circle with centre O, a point P lying outside the circle and two tangents PQ and PR on the circle from P.
केन्द्र O वाला एक वृत्त, वृत्त के बाहर का एक बिन्दु P तथा P से वृत्त पर दो स्पर्श रेखाएँ PQ और PR है।

To Prove: $PQ = PR$

Construction: Join OP, OQ, OR.
OP, OQ, OR को मिलाया।

Proof: The tangent at any point of a circle is perpendicular to the radius through the point of contact. स्पर्श बिन्दु से जाने वाली त्रिज्या पर लंब
वृत्त के किसी बिन्दु पर स्पर्श रेखा
होती है।
$\Rightarrow \angle OQP = \angle ORP$ —(1)

In $\triangle OQR$ and $\triangle ORP$,

$OQ = OR$ (radii of the circle)
(वृत्त की त्रिज्याएँ)

$\angle OQP = \angle ORP$ [from (1)]

$OP = OP$ (common)

$\therefore \triangle OQR \cong \triangle ORP$ (SAS)

$\Rightarrow PQ = PR$ (CPCT)

25

$\operatorname{cosec}\theta = \frac{13}{5} = \frac{H}{P}$

By Pythagoras theorem,

$H^2 = P^2 + B^2$

$\Rightarrow 13^2 = 5^2 + B^2$

$\Rightarrow 169 = 25 + B^2$

$\Rightarrow 169 - 25 = B^2$

$\Rightarrow 144 = B^2$

$\Rightarrow 12^2 = B^2$

$\Rightarrow B = 12$

$\cot\theta = \frac{B}{P} = \cancel{\frac{B}{P}}\ \frac{12}{5}$

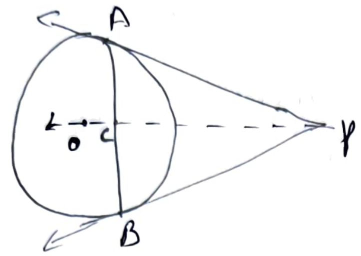
OR

$$\frac{\tan^2 60^\circ + \sin^2 45}{\operatorname{cosec}^2 30^\circ + \sec^2 60^\circ} = \frac{(\sqrt{3})^2 + \left(\frac{1}{\sqrt{2}}\right)^2}{(2)^2 + (2)^2}$$

$$= \frac{3 + \frac{1}{2}}{4 + 4} = \frac{6+1}{8 \times 2}$$

$$= \frac{7}{8} \text{ Ans.}$$

26 (A)



AB is a chord with circle of centre O.

AP and BP are tangents from a point P.

Join OP.

In ΔPCA and ΔPCB,

$PA = PB$ (Tangents from an exterior point are equal)

$\angle APC = \angle BPC$ [PA and PB are equally inclined to PO].

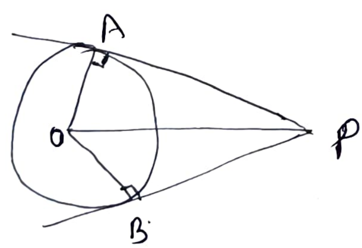
and $PC = PC$ [Common]

$\therefore \Delta PCA \cong \Delta PCB$ (SAS)

$\Rightarrow \angle PAC = \angle PBC$ (CPCT)

OR

(B)



Since, tangents from an exterior point are equal.

$PA = PB$

The tangent at any point of a circle is perpendicular to the radius through the point of contact.

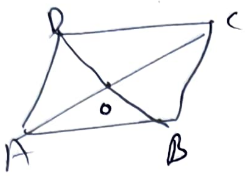
$\angle OAP = \angle OBP$ ($= 90^\circ$)

$\Rightarrow \angle OAP + \angle OBP = 90^\circ + 90^\circ = 180^\circ$

If sum of opposite angles is quadrilateral is 180°, then the quadrilateral is cyclic.

So, AOBP is a cyclic.

(21) $A(-4, 3), B(x, 2), C(6, y)$ and $D(3, 4)$



Diagonals of a llgm bisect each other.
समान्तर चतुर्भुज के विकर्ण एक दूसरे को समद्विभाजित करते हैं।

Mid point $= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

Mid-point of AC = Mid point of BD
AC का मध्य बिन्दु = BD का मध्य बिन्दु

$\left(\frac{-4+6}{2}, \frac{3+y}{2}\right) = \left(\frac{x+3}{2}, \frac{2+4}{2}\right)$

$\Rightarrow \left(\frac{2}{2}, \frac{3+y}{2}\right) = \left(\frac{x+3}{2}, \frac{6}{2}\right)$

$\Rightarrow \left(1, \frac{3+y}{2}\right) = \left(\frac{x+3}{2}, 3\right)$

$\frac{1}{1} = \frac{x+3}{2}$

$\Rightarrow x+3 = 2$

$\Rightarrow x = 2-3$

$\Rightarrow \boxed{x = -1}$

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

$\Rightarrow 3+y = 6$

$\Rightarrow y = 6-3$

$\Rightarrow \boxed{y = 3}$

Now, $A(-4, 3)$, $C(6, 3)$

$AC = \sqrt{(6+4)^2 + (3-3)^2}$

$= \sqrt{(10)^2 + (0)^2} = \sqrt{100} = 10$ units

$B(-1, 2)$, $D(3, 4)$

$BD = \sqrt{(3+1)^2 + (4-2)^2} = \sqrt{4^2 + 2^2} = \sqrt{16+4} = \sqrt{20} = \sqrt{4 \times 5} = 2\sqrt{5}$ units

(28) $6x^2 + 6\sqrt{3}x + 3 = 0$

$a = 6; \quad b = 6\sqrt{3}; \quad c = 3$

$$D = b^2 - 4ac$$

$$= (6\sqrt{3})^2 - 4 \times 6 \times 3$$

$$= 36 \times 3 - 72$$

$$= 108 - 72$$

$$= 36 \neq 0$$

Nature of the roots = two distinct roots

मूलों की प्रकृति = दो ~~विभिन्न मूल~~

$6x^2 + 6\sqrt{3}x + 3 = 0$

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

$$= \frac{-6\sqrt{3} \pm \sqrt{(6\sqrt{3})^2 - 4 \times 6 \times 3}}{2 \times 6}$$

$$= \frac{-6\sqrt{3} \pm \sqrt{108 - 72}}{12}$$

$$= \frac{-6\sqrt{3} \pm \sqrt{36}}{12}$$

$$= \frac{-6\sqrt{3} \pm 6}{12}$$

$$= \frac{\cancel{6}(-\sqrt{3} \pm 1)}{\cancel{12}\,2} = \frac{-\sqrt{3} \pm 1}{2}$$

$$= \frac{-\sqrt{3} + 1}{2}, \quad \frac{-\sqrt{3} - 2}{2}$$ Ans

29(A) $5x^2 - 4 - 8x$

Let $p(x) = 5x^2 - 8x - 4$

$a = 5, \quad b = -8, \quad c = -4$

Since α, β are the zeros of $p(x)$

चूँकि α, β, $p(x)$ के शून्यक हैं।

$$\alpha + \beta = \frac{-b}{a} = \frac{-(-8)}{5} = \frac{8}{5}$$

and $$\alpha\beta = \frac{c}{a} = \frac{-4}{5}$$

Now, $$\alpha^2 + \beta^2 = (\alpha+\beta)^2 - 2\alpha\beta$$

$$= \left(\frac{8}{5}\right)^2 - 2\times\left(-\frac{4}{5}\right)$$

$$= \frac{64}{25} + \frac{8}{5} = \frac{64+40}{25}$$

$$= \frac{104}{25}$$ Ans.

OR

(B) Sum of zeros, $S = -4$
शून्यकों का योग

and Product of zeros, $P = 12$
शून्यकों का गुणनफल

Quadratic Polynomial,
द्विघात बहुपद,

$$x^2 - Sx + P = 0$$

~~Sum of~~

$$\Rightarrow x^2 - (-4)x + 12 = 0$$

$$\Rightarrow x^2 + 4x + 12 = 0$$

$$x = \frac{-4 \pm \sqrt{(4)^2 - 4\times1\times12}}{2\times1}$$

$$= \frac{-4 \pm \sqrt{16-48}}{2} = \frac{-4 \pm \sqrt{-32}}{2}$$

No real roots.

(30)

$r = 21\text{cm}$

Angle makes in 60 minutes $= 360$

Angle makes in 20 minutes $= \frac{\cancel{360}^{6}}{\cancel{60}} \times 20$

$= 120^\circ$

Area swept by the minute hand

मिनट की सुई द्वारा रचित क्षेत्रफल

$$= \frac{\theta}{360^\circ} \times \pi r^2$$

$$= \frac{\cancel{120}^{1}}{\cancel{360}_{3}} \times \frac{22}{\cancel{7}} \times \cancel{21}^{3} \times 21$$

$$= 462\ \text{cm}^2$$

(31) Let $4\sqrt{3} + 3$ be ~~a~~ rational.

$4\sqrt{3} + 3 = \frac{a}{b}$, where a and b are coprime.

$\Rightarrow \quad 4\sqrt{3} = \frac{a}{b} - 3$

$\Rightarrow \quad \sqrt{3} = \frac{1}{4}\left(\frac{a}{b} - 3\right)$

$\Rightarrow \quad \sqrt{3} = \frac{a - 3b}{4b}$

Since a and b are integers, we get $\frac{1}{4}\left(\frac{a}{b} - 3\right)$ is rational.

and so $\sqrt{3}$ is rational.

But this contradicts the fact that $\sqrt{3}$ is irrational.

So our assumption is incorrect that $4\sqrt{3} + 3$ is rational.

Hence $4\sqrt{3} + 3$ is irrational.

माना $4\sqrt{3}+3$ एक परिमेय संख्या है।

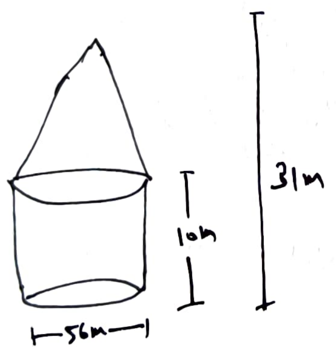
$\therefore$ $4\sqrt{3}+3 = \frac{a}{b}$ जहाँ, a और b सहअभाज्य है।

$\Rightarrow$ $4\sqrt{3} = \frac{a}{b} - 3$

$\Rightarrow$ $\sqrt{3} = \frac{1}{4}\left(\frac{a}{b} - 3\right)$

चूँकि a और b पूर्णांक हैं, इसलिए $\frac{1}{4}\left(\frac{a}{b}-3\right)$ एक परिमेय संख्या है
अर्थात $\sqrt{3}$ एक परिमेय संख्या है।
परंतु इससे इस तथ्य का विरोधाभास प्राप्त होता है कि $\sqrt{3}$ एक अपरिमेय संख्या है।
अतः हमारी कल्पना गलत है कि $4\sqrt{3}+3$ एक परिमेय संख्या है।
अतः $4\sqrt{3}+3$ एक अपरिमेय संख्या है।

(32)



~~Cone~~
cylinder बेलन

$d = 56m, \quad r = \frac{d}{2} = \frac{56}{2} = 28m$

$h_1 = 10m$

Cone. शंकु

$d = 56m, \quad r = 28m, \quad h_2 = 31-10 = 21m$

$l = \sqrt{r^2+h^2} = \sqrt{28^2+21^2} = \sqrt{784+441} = \sqrt{1225} = 35m$

Area of canvas used in making the tent
तम्बू बनाने में उपयोग किए गए कपड़े का क्षेत्रफल

$= \text{CSA of cylinder} + \text{CSA of cone}$

$= 2\pi r h_1 + \pi r l$

$= \pi r (2h_1 + l)$

$= \frac{22}{\cancel{7}} \times \cancel{28}^{4} \times (2\times 10 + 35)$

$= 88 \times (20+35)$

$= 88 \times 55$

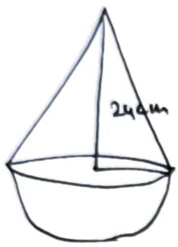
$= 4840\ m^2$

Rate = ₹ 7 per m²

Total Cost = 4840 × 7

= ₹ 33880

OR



Cone शंकु

$d = 20cm, \quad r = \frac{20}{2} = 10cm$

$h = 24cm$

Hemisphere अर्धगोला

$r = 10cm$

Volume of toy = volume of cone + volume of hemisphere

खिलौने का आयतन = शंकु का आयतन + अर्धगोले का आयतन

$= \frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3$

$= \frac{1}{3}\pi r^2 (h + 2r)$

$= \frac{1}{3} \times 3.14 \times (10)^2 (24 + 2 \times 10)$

$= \frac{314.00}{3} \times (24 + 20)$

$= \frac{314}{3} \times 44$

$= \frac{13,816}{3}$

$= 4605.33 \, cm^3$

(33)

(13) Let present age of Kush be x years

and ~~उस~~ present age of his duaghter be y years

माना कुश की वर्तमान आयु = x वर्ष

और उसकी बेटी की वर्तमान आयु = y वर्ष

6 years hence Kush's age = $(x+6)$ years

6 years hence his daughter's age = $(y+6)$ years

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

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

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

$$\Rightarrow x-3y = 12 \quad \text{— (I)}$$

and 3 years ago, Kush's age = $(x-3)$ years

3 years ago, his daughter's age = $(y-3)$ years

$$x-3 = 9(y-3)$$

$$\Rightarrow x-3 = 9y-27$$

$$\Rightarrow x-9y = -27+3$$

$$\Rightarrow x-9y = -24 \quad \text{— (II)}$$

Solving (I) & (II)

$$\cancel{x} - 3y = 12$$

$$\cancel{x} - 9y = -24$$

$$- \quad + \quad\quad +$$

$$6y = 36$$

$$y = \frac{\cancel{36}^{6}}{\cancel{6}}$$

$y = 6$ years

Putting the value of y in equation ①

$$x - 3 \times 6 = 12$$

$$\Rightarrow x - 18 = 12$$

$$\Rightarrow x = 12 + 18$$

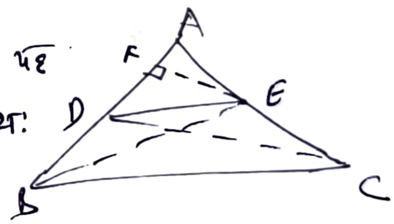
$$\Rightarrow x = 30 \text{ years}$$

Hence, Present age of Kush = 30 years
and, Present age of his daughter = 6 years

(34) Basic Proportionality Theorem (BPT)
आधारभूत समानुपातिकता प्रमेय

Given: A ΔABC in which a line DE parallel to side BC intersects other two sides AB and AC at D and E

एक ΔABC जिसमें भुजा ~~■~~ $DE \parallel BC$ खींची और यह एक रेखा अन्य दो भुजाओं AB और AC को क्रमशः D और E पर काटती है।



To Prove: $\dfrac{AD}{DB} = \dfrac{AE}{EC}$

Construction: Join BE and CD and draw $EF \perp AB$.

Proof: $\because$ Area of $\Delta ADE = \frac{1}{2} \times AD \times EF$

[Area of $\Delta = \frac{1}{2} \times \text{Base} \times \text{Height}$]

Area of $\Delta BDE = \frac{1}{2} \times DB \times EF$

$$\Rightarrow \frac{ar(ADE)}{ar(BDE)} = \frac{\cancel{\frac{1}{2}} \times AD \times \cancel{EF}}{\cancel{\frac{1}{2}} \times DB \times \cancel{EF}} = \frac{AD}{DB} \quad \text{---- ①}$$

Similarly, $\dfrac{ar(ADE)}{ar(CED)} = \dfrac{AE}{EC}$

But $ar(BDE) = ar(CED)$ [$\triangle BDE$ and $\triangle CED$ are on the same base DE and between the same parallels BC and DE.]

$\Rightarrow \dfrac{ar(ADE)}{ar(BDE)} = \dfrac{AE}{EC}$ --- (ii)

From (i) and (ii),

$$\frac{AD}{DB} = \frac{AE}{EC}$$

Hence proved.

(35) (A) 3 coins are tossed
3 सिक्के उछाले जाते हैं।
[HHH, HHT, HTH, THH, HTT, THT, TTH, TTT]

~~[illegible]~~

Total possible outcomes = 8

(i) all tails सभी पट = {TTT} (1 outcomes)

$P(\text{all tails}) = \frac{1}{8}$

(ii) exactly two tails {HTT, THT, TTH} = 3

$P(\text{exactly two tails}) = \frac{3}{8}$

(iii) exactly one head = {HTT, THT, TTH} = 3

$P(\text{exactly one head}) = \frac{3}{8}$

(iv) atleast two heads = {HHH, HHT, HTH, THH} = 4

$P(\text{atleast two heads}) = \frac{4}{8} = \frac{1}{2}$

(v) atmost two tails = {HHH, HHT, HTH, THH, HTT, THT, TTH} = 7

$P(\text{atmost two tails}) = \frac{7}{8}$

$\boxed{10Y}$

(B) Total number of possible outcomes $= 6 \times 6$
$= 36$

[a pair of different dice]

(i) a prime number on each dice

$= \{(1,1), (1,3), (1,5), (3,1), (3,3), (3,5), (5,1), (5,3), (5,5)\}$

favourable outcomes $= 9$

$$P = \frac{9}{36} = \frac{1}{4}$$

(ii) a sum of 9

$= \{(3,6), (4,5), (5,4), (6,3)\}$

favourable outcomes $= 4$

$$P = \frac{4}{36} = \frac{1}{9}$$

(iii) a sum of 7 or 11

Sum of 7 $= \{(1,6), (2,5), (3,4), (4,3), (5,2), (6,1)\}$

Sum of 11 $= \{5,6\}, \{6,5\}$

$$P = \frac{6+2}{36} = \frac{8}{36} = \frac{2}{9}$$

(iv) a doublet

$\{(1,1), (2,2), (3,3), (4,4), (5,5), (6,6)\}$

$$P = \frac{6}{36} = \frac{1}{6}$$

(v) a product of 12

$(2,6), (3,4), (4,3), (6,2)$

$$P = \frac{4}{36} = \frac{1}{9}$$