DATE ___/___/___

MON TUE WED THU FRI SAT SUN

Subject ....

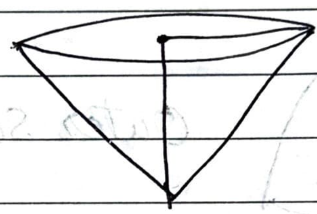
CBSE Class -10th Board Paper 2025-26

Mathematics (Standard) Set - 3 (Date - 17/02/26)

Paper Solution Q.P. Code - 30/5/3

Section-A

Sol. 1 C.S.A. of Cavity curved out (Cone) $\Rightarrow \pi r l$



$h = 10$ cm

$r = 10$ cm.

$r = 10$ cm.

$l = \sqrt{h^2 + r^2}$

$= \sqrt{10^2 + 10^2}$

$= \sqrt{200}$

$= 10\sqrt{2}$ cm.

C.S.A $\Rightarrow \pi r l$.

$\Rightarrow 3.14 \times 10 \times 10\sqrt{2}$ cm^2

$\Rightarrow 314\sqrt{2}$ cm^2 (A)

Sol. 2 A.P. $= \frac{-15}{4}, \frac{-10}{4}, \frac{-5}{4}, \ldots$

$a = \frac{-15}{4}$ $\quad d = \frac{-10}{4} - \left(\frac{-15}{4}\right) \Rightarrow \frac{-10}{4} + \frac{15}{4} \Rightarrow \frac{5}{4}$

$a_{16} - a_{12} \Rightarrow \left[\frac{-15}{4} + (16-1)\frac{5}{4}\right] - \left[\frac{-15}{4} + (12-1)\frac{5}{4}\right]$

$= \cancel{\frac{-15}{4}} + \frac{75}{4} + \cancel{\frac{15}{4}} - \frac{55}{4}$

$\Rightarrow \frac{75 - 55}{4} \Rightarrow \frac{20}{4} \Rightarrow 5$ (C)

Teacher's Signature ....

Subject .... DATE ___/___/___

MON TUE WED THU FRI SAT SUN

Sol. 3

$$P = \frac{\text{No. of tickets bought}}{\text{Total no. of tickets.}}$$

Given $P = 0.08$

~~total~~ no. of tickets $= 800$

$$0.08 = \frac{x}{800}$$

$$x = 0.08 \times 800$$

$$x = 64 \quad (A)$$

Sol. 4

Outer Surface Area $\Rightarrow [2\pi r^2 - 0.50]\, m^2$

Given $\Rightarrow r = 1.4m.$

door Area $= 0.50\, m^2$

$$\Rightarrow 2 \times \frac{22}{7} \times (1.4)^2 - 0.50$$

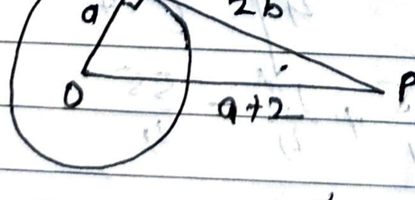
$$\Rightarrow \frac{44}{\cancel{7}} \times \frac{\overset{28}{\cancel{196}}}{100} - \frac{50}{100}$$

$$\Rightarrow \frac{1232 - 50}{100}$$

$$\Rightarrow \frac{1182}{100} \Rightarrow 11.82\, m^2$$

(C)

Sol. 5



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

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

$$\cancel{a^2} + 4 + 4a = 4b^2 + \cancel{a^2}$$

$$\cancel{4}(1+a) = \cancel{4}b^2$$

$$1 + a = b^2 \quad (D)$$

Sol. 6 $= \dfrac{\sec A}{\sqrt{\sec^2 A - 1}}$ $[\sec^2 A - 1 = \tan^2 A]$

$= \dfrac{\sec A}{\tan A} \Rightarrow \dfrac{\frac{1}{\cos A}}{\frac{\sin A}{\cos A}} \Rightarrow \dfrac{1}{\sin A} \Rightarrow \operatorname{cosec} A$

(C)

Sol. 7

P (−4, −2) ——K—— R (0, y) ——1—— Q (10, 4)

$R[0, y] = \left[\dfrac{m x_2 + n x_1}{m+n}, \dfrac{m y_2 + n y_1}{m+n}\right]$

$R[0, y] = \left[\dfrac{K(10) + 1(-4)}{K+1}, \dfrac{K(4) + 1(-2)}{K+1}\right]$

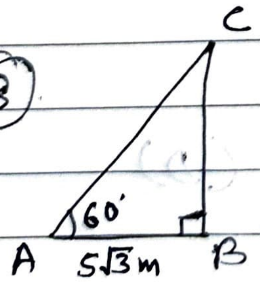
$0 = \dfrac{10K + (-4)}{K+1}$

$10K - 4 = 0$

$10K = 4$

$K = \dfrac{4}{10} = \dfrac{2}{5} \Rightarrow 2:5$ (A)

Sol. 8



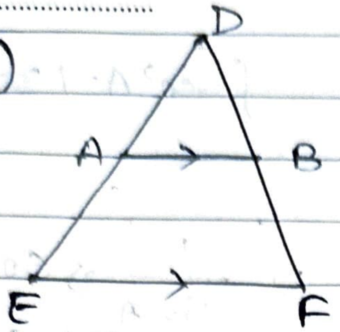
To find AC = ?

$\cos\theta = \dfrac{B}{H} \Rightarrow \cos 60^\circ = \dfrac{AB}{AC}$

$\dfrac{1}{2} = \dfrac{5\sqrt{3}}{AC}$

$AC = 10\sqrt{3}$ m. (B)

Sol. 9



AB = 24 cm

EF = 36 cm

DA = 7 cm.

AE = ?

By BPT $\frac{AD}{DE} = \frac{AB}{EF}$

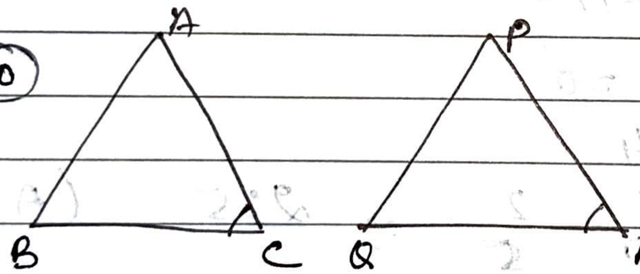
$$\frac{7}{DE} = \frac{\cancel{24}^{2}}{\cancel{36}_{3}}$$

$$DE = \frac{21}{2}\ cm$$

$$AE = DE - AD = \frac{21}{2} - 7$$

$$AE = \frac{21-14}{2} = \frac{7}{2} \Rightarrow 3.5\ cm.$$

Sol. 10



SAS.

$$\frac{AC}{PR} = \frac{BC}{QR}$$

$$\frac{AC}{BC} = \frac{PR}{QR} \quad (D)$$

Sol. 11 $\bar{x} = a + \frac{\sum f_i u_i}{\sum f_i} \times h$

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

$$64 = 62.5 + 5 \times \bar{u}$$

(C)

$$\boxed{\bar{u} = 0.3}$$

DATE ___/___/___

MON TUE WED THU FRI SAT SUN

Subject ....

Sol. 12 $\sin\theta = \frac{1}{9}$ $\Rightarrow \frac{9\operatorname{cosec}\theta + 1}{9\operatorname{cosec}\theta - 1}$

$\operatorname{cosec}\theta = 9$ $\Rightarrow \frac{9 \times 9 + 1}{9 \times 9 - 1}$

$\Rightarrow \frac{82}{80}$ (D)

Sol. 13 The probability of an event must be b/w 0 & 1

$\frac{10}{0.2} \Rightarrow \frac{100}{2} \Rightarrow 50$ (C)

Sol. 14 $3x^2 - 7x + m = 0$ $a = 3$ $b = -7$ $c = m$

Real & Equal Roots $b^2 - 4ac = 0$

$(-7)^2 - 4(3)(m) = 0$

$49 - 12m = 0$

$\Rightarrow 12m = 49$

$m = \frac{49}{12}$ (B)

Sol. 15 Zeroes $\Rightarrow -3, 8$

(B) $(x+3)(-x+8)$

Sol 16 $x^2 - px + 6 = 0$ for rational roots Discriminant must be a perfect Square.

$D = b^2 - 4ac \Rightarrow p^2 - 24$

(A) $p = 1$ $\Rightarrow (1)^2 - 24 \Rightarrow -23$ (not a perfect Sq.)

(B) $p = -5$ $\Rightarrow (-5)^2 - 24 \Rightarrow 1$ (perfect Sq.)

(B) ~~Ans~~

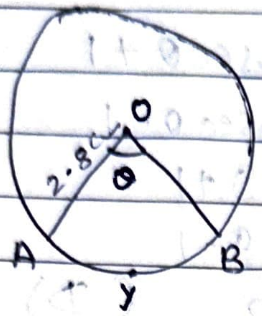
Teacher's Signature ....

DATE __/__/__

MON TUE WED THU FRI SAT SUN

Subject ....

Sol. 17



length of Arc (AYB) = 2·2 cm.

Radius (r) = 2·8 cm.

length of Arc $= \frac{\theta}{360} \times 2\pi r$

$\frac{22}{10} = \frac{\theta}{360} \times 2 \times \frac{22}{7} \times \frac{28}{10}$

$\theta = \frac{180}{4}$

$\theta = 45°$ (C)

Sol. 18 total Outcomes $= 6^2 = 36$ $(x, y) \Rightarrow x > y$

favorable outcomes ⇒ (2,1), (3,1), (3,2)

⇒ 15 (4,1), (4,2) (4,3)

(5,1) (5,2) (5,3), (5,4)

(6,1) (6,2) (6,3), (6,4) (6,5)

$P = \frac{15}{36} \Rightarrow \frac{5}{12}$ (A)

Sol. 19 Assertion (A) = true. HCF = 18m.

Reason (R) = true HCF 18m ≤ 18m.

OPtion (A) Both A & R are true and R is correct explaination of the A

Sol. 20 $3x - 5y + 7 = 0$, $-6x + 10y + 14 = 0$

$\frac{3}{-6}$ $\frac{-5}{10}$, $\frac{7}{14}$

$-\frac{1}{2} = \frac{-1}{2} \neq \frac{1}{2}$ Parallel lines (Inconsistent)

Teacher's Signature ....

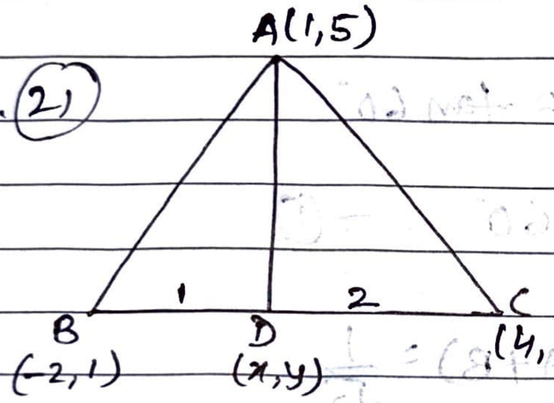
Assertion (A) → True.

Reason (R) = false

Option (c) Assertion (A) is true, but Reason (R) is false.

Section - B.

Sol. 21



$D(x,y) = \left[\dfrac{mx_2+nx_1}{m+n}, \dfrac{my_2+ny_1}{m+n}\right]$

$D(x,y) = \left[\dfrac{1(4)+2(-2)}{1+2}, \dfrac{1(2)+2(1)}{1+2}\right]$

$D(x,y) = \left[\dfrac{4-4}{3}, \dfrac{2+2}{3}\right]$

$D(x,y) = \left[0, \dfrac{4}{3}\right]$

length $AD = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$AD = \sqrt{(0-1)^2+\left(\frac{4}{3}-5\right)^2}$

$AD = \sqrt{1+\dfrac{121}{9}} \Rightarrow \dfrac{\sqrt{130}}{9}$ unit Ans.

Sol. 22 (a) $\dfrac{\sin^3 60^\circ - \tan 30^\circ}{\cos^2 45^\circ}$

$\Rightarrow \dfrac{\left(\frac{\sqrt{3}}{2}\right)^3 - \frac{1}{\sqrt{3}}}{\left(\frac{1}{\sqrt{2}}\right)^2} \Rightarrow \dfrac{\frac{3\sqrt{3}}{8} - \frac{1}{\sqrt{3}}}{\frac{1}{2}}$

Subject ....

DATE __/__/__

MON TUE WED THU FRI SAT SUN

$$\Rightarrow \frac{\frac{9-8}{8\sqrt{3}}}{\frac{1}{2}}$$

$$\Rightarrow \frac{1}{8\sqrt{3}} \times 2 \Rightarrow \frac{1}{4\sqrt{3}}$$ Ans.

~~So~~ (b) $\tan(A+2B) = \sqrt{3}$

$\tan(A+2B) = \tan 60^\circ$

$A+2B = 60^\circ$ — (1)

$\cancel{\tan}$ $\sin(2A+B) = \frac{1}{\sqrt{2}}$

$\sin(2A+B) = \sin 45^\circ$

$2A+B = 45^\circ$ — (2)

$A+2B = 60^\circ$ — (3)

$2A+B = 45^\circ \quad \times 2 \Rightarrow 4A+2B = 90^\circ$ — (4)

~~Eqn~~ Sub. Eqn (4) − Eqn (3)

$4A+\cancel{2B} - A - \cancel{2B} = 90^\circ - 60^\circ$

$3A = 30^\circ$

$\boxed{A = 10^\circ}$

from Eqn (1) $10 + 2B = 60^\circ$

$2B = 50^\circ$

$\boxed{B = 25^\circ}$

$A = 10^\circ, B = 25^\circ$ Ans.

Teacher's Signature ....

DATE __/__/__

MON TUE WED THU FRI SAT SUN

Subject ....

Sol. (23) Total no. of Balls = 25

let no. of ~~green~~ Yellow balls = x

then no. of green balls = $25-x$

$$P(\text{Green}) = \frac{\text{No. of green Balls}}{\text{No. of total Balls}}$$

$$\frac{3}{5} = \frac{25-x}{25}$$

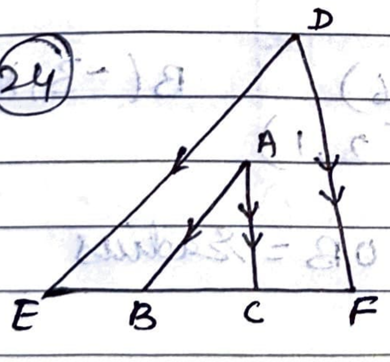
$$25-x = \frac{\cancel{25}^{5} \times 3}{\cancel{5}}$$

$$x = 25-15$$

$$\boxed{x = 10}$$

No. of Yellow Balls = 10 Ans.

Sol. (24)



Given BC = 10 cm.

AB = 7 cm.

EB = CF = 5 cm

then EF = 10+10 = 20 cm

$\Delta ABC \sim \Delta DEF$

then $\frac{AB}{DE} = \frac{BC}{EF}$

$$\frac{7}{DE} = \frac{10}{20}$$

$$DE = \frac{2\cancel{0} \times 7}{1\cancel{0}}$$

$$\boxed{DE = 14 \text{ cm.}}$$ Ans.

Teacher's Signature ....

Sol. (25) To Prove the statement by contradiction assume that $14-2\sqrt{3}$ is a rational no.

let $14-2\sqrt{3} = \frac{a}{b}$ (a, b are co-prime)

$$2\sqrt{3} = 14 - \frac{a}{b}$$

$$2\sqrt{3} = \frac{14b-a}{b}$$

$$\sqrt{3} = \frac{14b-a}{2b}$$

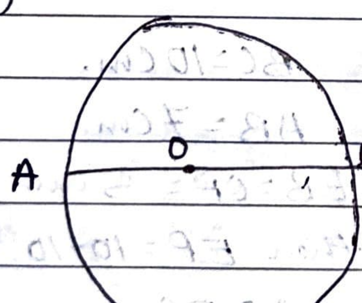
$\frac{14b-a}{2a}$ are rational no, but given that $\sqrt{3}$ is irrational

It's contradiction.

therefore $14-2\sqrt{3}$ is a irrational no.

Section - C

Sol. (26) (a)



A(5,6) B(-3, K)

O(2,1)

OA = OB = radius

$$OA = r = \sqrt{(5-2)^2+(6-1)^2}$$

$$r = \sqrt{9+25}$$

$$r = \sqrt{34} = \cancel{8} \text{ unit}$$

$$OB = \overset{\sqrt{34}}{\cancel{8}} = \sqrt{(2+3)^2+(1-K)^2}$$

$$\sqrt{34} \; \cancel{86} = \sqrt{25+\cancel{K+K^2-2K}\,(1-K)^2}$$

$$\cancel{K^2-2K}, \; \cancel{(1-K)^2 = 36 = 25}$$

$$\cancel{(1-K)^2 = 0}$$

$$25+(1-K)^2 = 34$$

$$(1-K)^2 = 34-25$$

$$(1-K)^2 = 9$$
$$1-K = \sqrt{9}$$
$$1-K = \pm 3$$
$$K-1 = \pm 3$$
$$\boxed{K = 4, -2}$$ Ans.

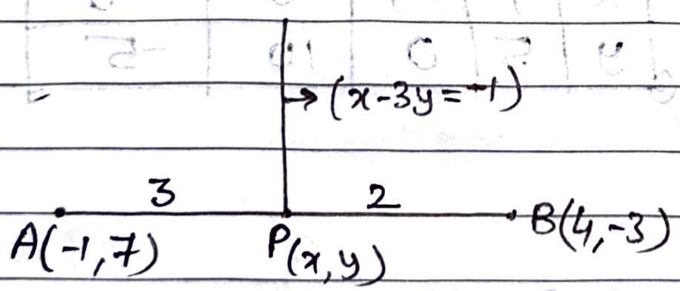
Lenth of Chord AB   A(5,6) ———— B(-3,K)

$$AB = \sqrt{(5+3)^2 + (6-K)^2}$$
$$AB = \sqrt{64 + (6-K)^2}$$

put $K = 4$,
$$AB = \sqrt{64 + (6-4)^2} \Rightarrow \sqrt{64+4} \Rightarrow \sqrt{68} \text{ unit}$$

put $K = -2$,
$$AB = \sqrt{64 + (6+2)^2} \Rightarrow \sqrt{64+64} \Rightarrow \sqrt{128} \text{ unit}$$
Ans.

(b)



$$P(x,y) = \left[\frac{3(4)+2(-1)}{3+2}, \frac{3(-3)+2(7)}{3+2}\right]$$

$$P(x,y) = \left[\frac{12-2}{5}, \frac{-9+14}{5}\right]$$

$$P(x,y) = \left[\frac{10}{5}, \frac{5}{5}\right] \Rightarrow P(x,y) = (2,1)$$

& Eq^n of line $= x - 3y = -1$

put $x = 2$, $y = 1$ $\Rightarrow$ $2 - 3(1) = -1$
$$2 - 3 = -1$$
$$-1 = -1$$ Proved

DATE __/__/__

MON TUE WED THU FRI SAT SUN

Subject ....

length of PA $= \sqrt{(2+1)^2+(1-7)^2}$

$PA = \sqrt{9+36} \Rightarrow \sqrt{45} \Rightarrow 3\sqrt{5}$ unit

Ans

length of PB $= \sqrt{(2-4)^2+(1+3)^2}$

$PB = \sqrt{4+16} \Rightarrow \sqrt{20} \Rightarrow 2\sqrt{5}$ unit Ans

Sol. 27 $x = -3$ $5x - 2y = -5$

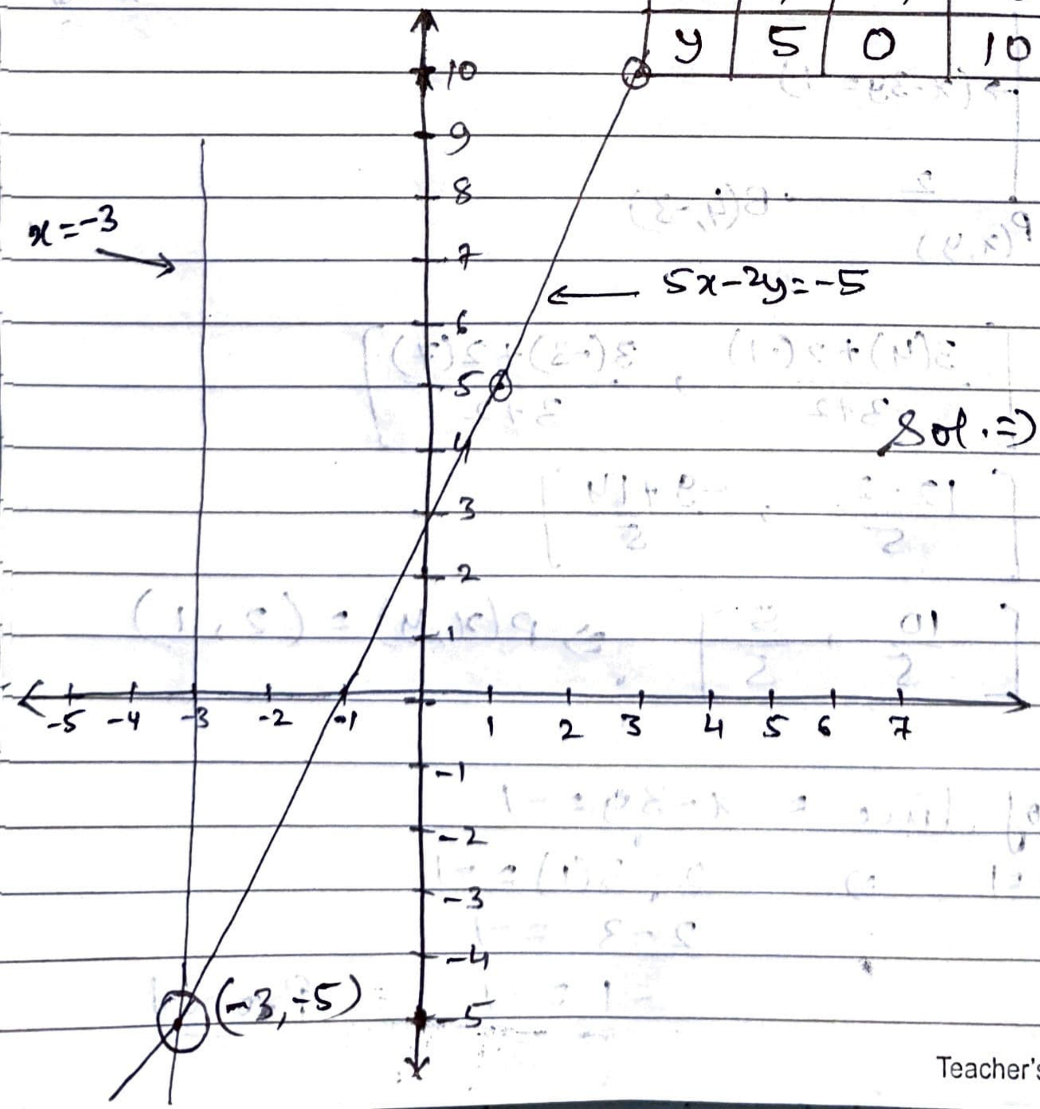
$\cancel{5x} =$

$2y - 5x = 5$

$2y = 5 + 5x$

$y = \frac{5+5x}{2}$

x	1	-1	3	-3
y	5	0	10	-5



(x, y):

Sol. $\Rightarrow (-3, -5)$

Ans

Teacher's Signature ....

DATE ___/___/___

MON TUE WED THU FRI SAT SUN

Subject ....

Sol. 28 (a) given, $a_{15} - a_8 = 21$ $[a_n = a+(n-1)d]$

$\cancel{a}+14d - \cancel{a}-7d = 21$

$14d-7d = 21$

$7d = 21$

$\boxed{d = 3}$

given $S_{10} = 55$ $\left[S_n = \frac{n}{2}(2a+(n-1)d)\right]$

$\overset{11}{\cancel{55}} = \frac{\overset{5}{\cancel{10}}}{\cancel{2}}[2a+(10-1)3]$

$11 = 2a+27$

$2a = 11-27$

$a = \frac{-16}{2}$

$\boxed{a = -8}$

~~AP~~ ⇒ $a = -8$

$a+d = -8+3 = -5$

$a+2d = -8+6 = -2$

$a+3d = -8+9 = 1$

AP ⇒ $-8, -5, -2, 1, \ldots\ldots$ Ans

(b) $S_n = 2n^2+13n$

$n=1$ $S_1 = 2(1)^2+13(1)$

$= 2+13 = 15$

first term $(a) = 15$

Teacher's Signature ....

$n=2$ $\quad S_2 = 2(2)^2 + 13(2)$
$= 8 + 26$
$S_2 = 34$

Second term $(a+d) \Rightarrow 34 - 15 \Rightarrow 19$

$a+d = 19$
$d = 19 - a$
$d = 19 - 15 \Rightarrow 4$

n^{th} term $\quad a_n = a + (n-1)d$
$a_n = 15 + (n-1)(4)$
$a_n = 15 + 4n - 4$
$\boxed{a_n = 11 + 4n}$ Ans.

10^{th} term $\quad a_n = 11 + 4n$
$a_{10} = 11 + 4 \times 10$
$\boxed{a_{10} = 51}$ Ans.

Sol. 29 Prime factorization
$156 = 2^2 \times 3 \times 13$
$216 = 2^3 \times 3^3$
$HCF(156, 216) = 2^2 \times 3 \Rightarrow 4 \times 3 = 12$ cm.

The maximum side length of each square is $= 12$ cm

No. of Squares along the width $\Rightarrow \frac{156}{12} \Rightarrow 13$

No. of Squares along the length $\Rightarrow \frac{216}{12} \Rightarrow 18$

Total No. of squares $\Rightarrow 13 \times 18 \Rightarrow 234$ Ans

Q (30) $\dfrac{\tan\theta}{1-\cot\theta} + \dfrac{\cot\theta}{1-\tan\theta} = 1 + \tan\theta + \cot\theta$

L.H.S. $\dfrac{\tan\theta}{1-\cot\theta} + \dfrac{\cot\theta}{1-\tan\theta}$

$\Rightarrow \dfrac{\tan\theta}{\left(1-\frac{1}{\tan\theta}\right)} + \dfrac{\frac{1}{\tan\theta}}{(1-\tan\theta)}$

$\Rightarrow \dfrac{\tan^2\theta}{(\tan\theta-1)} + \dfrac{1}{\tan\theta(1-\tan\theta)}$

$\Rightarrow \dfrac{\tan^2\theta}{(\tan\theta-1)} - \dfrac{1}{\tan\theta(\tan\theta-1)}$

$\Rightarrow \dfrac{\tan^3\theta - 1^3}{\tan\theta(\tan\theta-1)}$

$[a^3-b^3=(a-b)(a^2+ab+b^2)]$

$\Rightarrow \dfrac{\cancel{(\tan\theta-1)}(\tan^2\theta+\tan\theta+1)}{\tan\theta\,\cancel{(\tan\theta-1)}}$

$\Rightarrow \dfrac{\tan^2\theta+\tan\theta+1}{\tan\theta}$

$\Rightarrow \dfrac{\tan^2\theta}{\tan\theta} + \dfrac{\tan\theta}{\tan\theta} + \dfrac{1}{\tan\theta}$

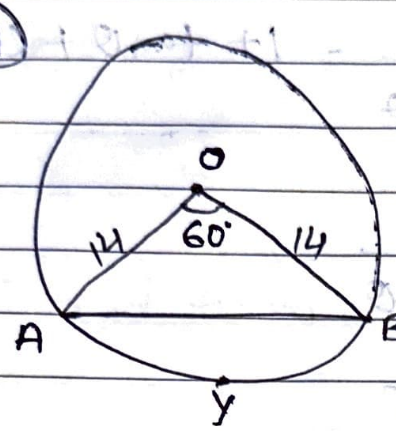
$\Rightarrow \tan\theta + 1 + \cot\theta = RHS.$ Proved

DATE __/__/__

MON TUE WED THU FRI SAT SUN

Subject ....

Sol. 31



chord AB

Radius OA = OB = 14 cm.

$\angle AOB = 60°$

Area of Minor Sector = $\frac{\theta}{360} \times \pi r^2$

$= \frac{\cancel{60}}{\cancel{360}_{\cancel{6}\,3}} \times \frac{\cancel{22}^{11}}{\cancel{7}} \times \cancel{14}^{2} \times 14$

$= \frac{11 \times 2 \times 14}{3}$

$= \frac{22 \times 14}{3} \Rightarrow \frac{308}{3}$

$\Rightarrow 102.66 \text{ cm}^2$ Ans

length of the Arc AYB $\Rightarrow \frac{\theta}{360} \times 2\pi r$

$\Rightarrow \frac{\cancel{60}}{\cancel{360}_{\cancel{6}\,3}} \times \cancel{2} \times \frac{22}{\cancel{7}} \times \cancel{14}^{2}$

$\Rightarrow \frac{22 \times 2}{3} \Rightarrow \frac{44}{3}$

$\Rightarrow 14.66$ cm.

Perimeter of Smaller Segment $\Rightarrow$ OA + Arc (AYB) + OB

$\Rightarrow 14 + 14.66 + 14$

$\Rightarrow 42.66$ cm

Ans

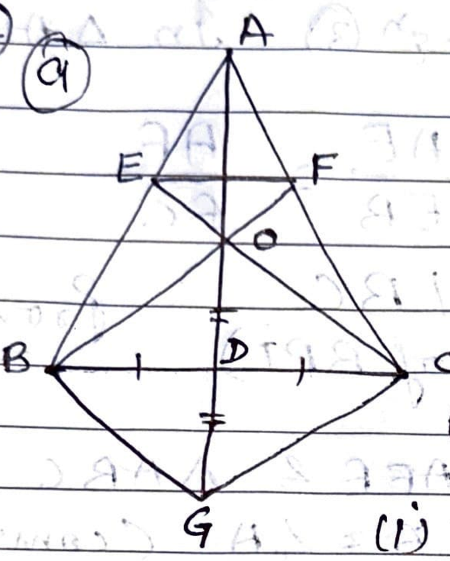
Teacher's Signature ....

DATE ___/___/___

Subject .... Section-D

MON TUE WED THU FRI SAT SUN

Sol. 32 (a)



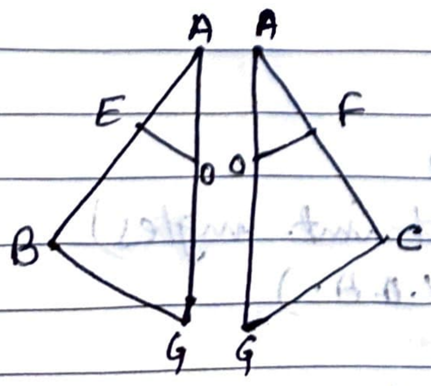
Given ⇒ $BD = CD$
$OD = DG$

To Prove :- i) $OBGC$ is ||gm
ii) $EF \parallel BC$
iii) $\triangle AEF \sim \triangle ABC$

Proof :-

(i) If BC & OG are diagonals of a Quadrilateral $OBGC$
$OD = DG$
$BD = DC$
diagonals are Bisects each other
(In a quadrilateral if diagonals bisects each other then its a ||gm)
So $OBGC$ is a ||gm. Proved.

(ii) $OBGC$ is ||gm $BG \parallel OC$
also $BG \parallel EC$
also $BG \parallel EO$
& $GC \parallel BO$
also $GC \parallel BF$
also $GC \parallel OF$



from $\triangle ABG \Rightarrow BG \parallel EO$

$$\frac{AE}{EB} = \frac{AO}{OG} \text{ (By BPT)} \quad -①$$

from $\triangle AGC \Rightarrow GC \parallel OF$

$$\frac{AF}{FC} = \frac{AO}{OG} \text{ (By BPT)} \quad -②$$

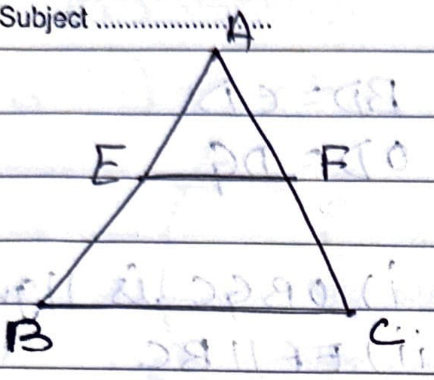
from Eq^n ① & ② $\frac{AE}{EB} = \frac{AF}{FC}$ -③

Teacher's Signature ....

DATE ___/___/___

MON TUE WED THU FRI SAT SUN

Subject ....

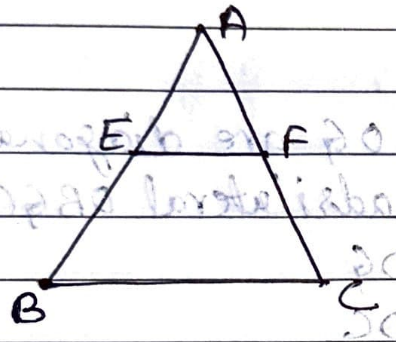


from Eq^n ③ In ΔABC

$$\frac{AE}{EB} = \frac{AF}{FC}$$

$EF \parallel BC$ (By Conv. of BPT) Proved

(iii)



In ΔAEF & ΔABC

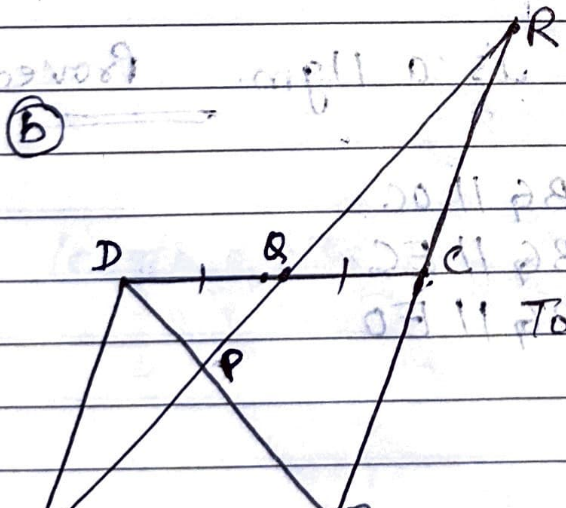
$\angle A = \angle A$ (common)

$\angle AEF = \angle ABC$ ($EF \parallel BC$, Corresponding Angles)

By AA Similarity Cri..

$\Delta AEF \sim \Delta ABC$ Proved

(B)



Given :- $DQ = QC$

ABCD is ||gm.

To Prove :- i) $AQ = QR$

ii) $AP = 2PQ$

iii) $PR = 2AP$

(i) from ΔADQ & ΔRCQ

$DQ = CQ$ (given)

$\angle ADQ = \angle RCQ$ (Alt. int. angles)

$\angle DQA = \angle CQR$ (V.O.A.)

By ASA

$\Delta ADQ \cong \Delta RCQ$

By CPCT $\boxed{AQ = QR}$ Proved

Teacher's Signature ....

(ii) from ΔAPB & ΔQPD

$\angle APB = \angle QPD$ (V.O.A.)

$\angle PAB = \angle DQP$ (Alt. int. angle)

By AA Similarity Cri.

$\Delta APB \sim \Delta QPD$

$\frac{AP}{PQ} = \frac{AB}{DQ}$

$\left[\begin{array}{l} AB = CD \\ AB = 2DQ \end{array}\right.$

$\frac{AP}{PQ} = \frac{2\cancel{DQ}}{\cancel{DQ}}$

$\boxed{AP = 2PQ}$ Proved

(iii) $AQ = QR$ (Proved)

$AR = 2AQ$

$AR = AP + PQ + QR$

$AP = 2PQ$ (Proved)

$PQ = \frac{1}{2} AP$

$QR = AQ \Rightarrow AP + PQ$

$\Rightarrow AP + \frac{1}{2} AP \Rightarrow \frac{3}{2} AP$

$PR \Rightarrow PQ + QR \Rightarrow \frac{1}{2} AP + \frac{3}{2} AP \Rightarrow \frac{\overset{2}{\cancel{4}}}{\cancel{2}} AP$

$\boxed{PR = 2AP}$ Proved

DATE __/__/__

MON TUE WED THU FRI SAT SUN

Subject ....

Q 33 (a)

class - Int.	x_i	f_i	$f_i x_i$
0 - 20	10	12	120
20 - 40	30	15	450
40 - 60	50	P	50P
60 - 80	70	28	1960
80 - 100	90	13	1170
		$\Sigma f_i = 68 + P$	$\Sigma f_i x_i \Rightarrow 3700 + 50P$

Mean $\bar{x} = \frac{\Sigma f_i x_i}{\Sigma f_i}$ given $\bar{x} = 53$

$$53 = \frac{3700 + 50P}{68 + P}$$

$$53(68 + P) = 3700 + 50P$$

$$3604 + 53P = 3700 + 50P$$

$$3P = 96$$

$$\boxed{P = 32}$$

class- interval	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
f	12	15	32	28	13

∵ Max class frequency = 32

So, modal class = 40 - 60

$$\text{Mode} = l + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] \times h$$

$l = 40$, $h = 20$

$f_1 = 32$

$f_0 = 15$

$f_2 = 28$

Teacher's Signature ....

DATE ___/___/___

MON TUE WED THU FRI SAT SUN

Subject ....

$$\text{Mode} = 40 + \left[\frac{32-15}{2\times 32 - \cancel{32} - 15}\right] \times 20$$

28

$$= 40 + \frac{17}{64-43} \times 20$$

$$= 40 + \frac{340}{21}$$

$$= 40 + 16.19$$

$$\boxed{\text{Mode} = 56.19}$$ Ans

(b)

Mid-Value (x)	Class Interval	f	c.f
115	110-120	12	12
125	120-130	15	27
135	130-140	20	47
145	140-150	16	63
155	150-160	10	73
165	160-170	16	89
175	170-180	11	100
		N = 100	

~~Mo~~ Median Class $= \frac{N}{2} = \frac{100}{2} = 50$

Median class $= 140-150$

$$\text{Median} = l + \frac{\frac{N}{2} - cf}{f} \times h$$

$l = 140$

$\frac{N}{2} = 50$

$cf = 47$

$h = 10$

$f = 16$

$$\text{Median} = 140 + \frac{50-47}{\cancel{16}\,8} \times \cancel{10}\,5$$

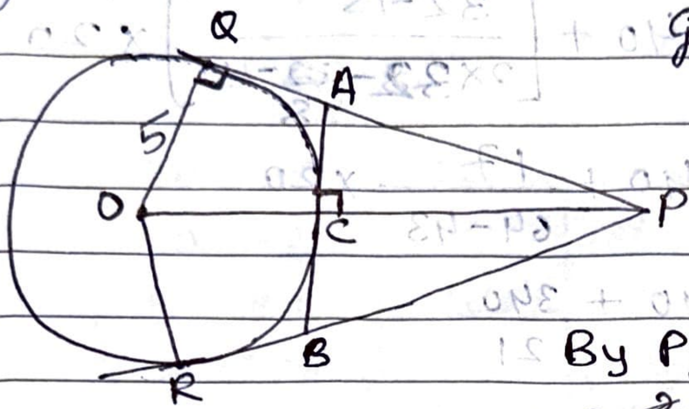
$$= 140 + \frac{15}{8}$$

$$= 140 + 1.87$$

$$\boxed{\text{Median} = 141.87}$$ Ans

Teacher's Signature ....

Sol. (34)



Given: $OQ = OR = 5$ cm.
$OP = 13$ cm.

By Pyth. th.

$\cancel{PQ^2 = OQ^2 + 0}$

$PQ^2 = OP^2 - OQ^2$

$PQ^2 = 13^2 - 5^2$

$PQ = \sqrt{144}$

$\boxed{PQ = 12}$

let $AC = x$ cm. $= AQ$

$AP = AQ - AQ$

$AP = (12 - x)$ cm.

$PC = OP - OC$

$PC = (13 - 5) \Rightarrow 8$ cm.

In $\triangle ACP$, by Pyth. th.

$AP^2 = AC^2 + PC^2$

$(12-x)^2 = x^2 + 8^2$

$144 + x^2 - 24x = x^2 + 64$

$24x = 144 - 64$

$x = \frac{80}{24}$

$AB \Rightarrow 2AC \Rightarrow 2x \Rightarrow \frac{2 \times 80}{24} \Rightarrow \frac{80}{12}$

$\boxed{AB \Rightarrow \frac{20}{3}}$ cm.

Ans

DATE __/__/__

MON TUE WED THU FRI SAT SUN

Subject ....

$\therefore PA = (12 - x)$ cm.

$PA = 12 - \frac{20}{3}$ cm.

$PA = \frac{36-20}{3}$ cm.

$\boxed{PA = \frac{16}{3} \Rightarrow 5.33 \text{ cm}}$ Ans.

Sol. 35 Let the time taken by Smaller diameter tap = x

then, the time taken by larger diameter tap = $(x-4)$

A.T.Q.

$$\frac{1}{x} + \frac{1}{(x-4)} = \frac{1}{8\,8/9}$$

$$\frac{x-4+x}{x(x-4)} = \frac{9}{80}$$

$$80(2x-4) = 9x(x-4)$$

$$160x - 320 = 9x^2 - 36x$$

$$9x^2 - 196x + 320 = 0$$

Quadratic formula :-

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

$a = 9$
$b = -196$
$c = 320$

$$x = \frac{196 \pm \sqrt{(-196)^2 - 4(9)(320)}}{2 \times 9}$$

$$x = \frac{196 \pm \sqrt{38416 - 11520}}{18}$$

$$x = \frac{196 \pm \sqrt{26896}}{18}$$

$$x = \frac{196 \pm 164}{18}$$

Teacher's Signature ....

$x = \frac{196+164}{8}$

$x = \frac{360}{8}$

$\boxed{x = 20}$

$x = \frac{196-164}{18}$

$x = \frac{32}{18}$

$\boxed{x = 1.78}$ Neglect

$(x-4) = -ive$

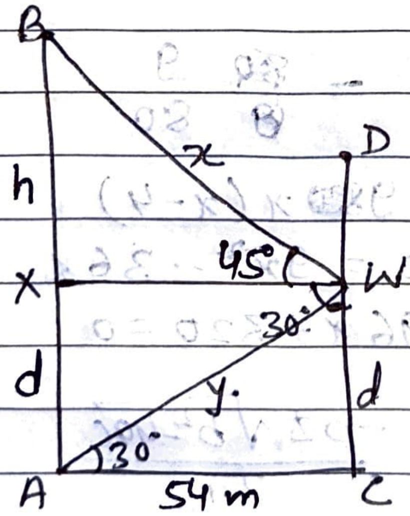
time taken by $\wedge$ smaller tap $= x \Rightarrow 20$ hours.

time taken by larger tap $= (x-4) \Rightarrow (20-4) = 16$ hours

Ans.

Section - E

Sol. 36



(i) $\sin\theta = \frac{P}{H}$

$\sin 30° = \frac{d}{y}$

$\frac{1}{2} = \frac{d}{y}$

$2d = y$

$\boxed{y = 2d}$ Ans.

Subject .... DATE __/__/__

MON TUE WED THU FRI SAT SUN

(ii) $\tan\theta = \frac{P}{B}$

$\tan 45^\circ = \frac{BX}{WX}$

$1 = \frac{h}{54}$

$\boxed{h = 54\ m}$ Ans.

(iii) (a) $\tan\theta = \frac{WC}{AC}$

$\tan 30^\circ = \frac{d}{54}$

$\frac{1}{\sqrt{3}} = \frac{d}{54}$

$d = \frac{54}{\sqrt{3}}\ m$

height of water tank $= h+d$

$= 54 + \frac{54}{\sqrt{3}}\ m.$

$= \frac{54(1+\sqrt{3})}{\sqrt{3}}\ m.$ Ans.

(b) In $\triangle BXW$,

$\cos\theta = \frac{B}{H}$

$\cos 45^\circ = \frac{XW}{BW}$

$\frac{1}{\sqrt{2}} = \frac{54}{x}$

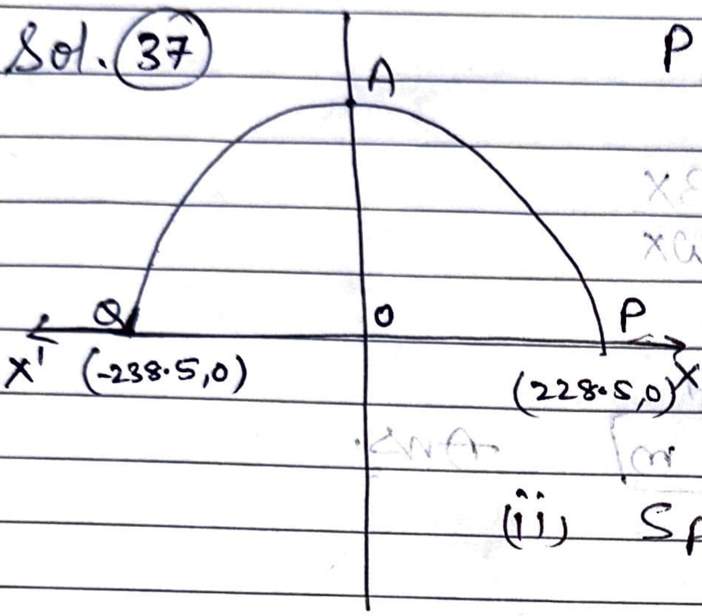
$\boxed{x = 54\sqrt{2}}$ Ans.

height of the window above ground level $(d) = \frac{54}{\sqrt{3}}\ m$

Ans.

Teacher's Signature ....

Sol. 37



$P(x) = -0.0025x^2 - 0.025x + 136$

(i) Co-ordinate of (A) = $(x = 0)$

$\Rightarrow (0, 136)$ Ans.

(ii) Span of the arch = horizontal distance b/w PQ

$\Rightarrow OQ + OP$

$\Rightarrow 228.5 + 238.5$

$\Rightarrow 467$ unit Ans.

(iii) (a) Zeroes of the polynomial $\alpha = -238.5$

$\beta = 228.5$

Relation $\alpha + \beta = \frac{-b}{a}$ | $a = -0.0025$, $b = -0.025$, $c = 136$

$-238.5 + 228.5 = \frac{+(-0.025)}{+0.0025}$

$-10 = -10$ ✓ Verified.

$\alpha\beta = \frac{c}{a}$

$(-238.5)(228.5) = \frac{136 \times 10000}{-0.0025}$

$-54,497.25 = -54,400$ $\approx$

DATE __/__/__

MON TUE WED THU FRI SAT SUN

Subject ....

(b) $p(x) = -0.0025x^2 - 0.025x + 136$

$p(100) \Rightarrow -0.0025(100)^2 + 0.025(100) + 136$

$p(100) = -25 - 2.5 + 136$

$= -27.5 + 136$

$= 108.5$

$p(-100) \Rightarrow -0.0025(-100)^2 - 0.025(-100) + 136$

$= -25 + 2.5 + 136$

$= 113.5$

$p(100) \neq p(-100)$ Ans.

Sol. (38) (i) Surface area of the bulb $= 4\pi r^2$

$d = 7$ cm.

$r = 3.5$ cm.

$\Rightarrow 4 \times \frac{22}{\cancel{7}} \times \frac{3.5 \times \cancel{3.5}\,5}{100}$

$\Rightarrow \frac{15400}{100}$ cm^2

$\Rightarrow 154$ cm^2 Ans

(ii) Maximum diameter = [Smallest dimension − 2 cm

$= 12$ cm $- 2$ cm.

max. diameter $= 10$ cm. Ans

(iii) (a) fabric Area without fold $= 2(l+b) \times h$.

fabric Area with fold on top & bottom edges $\Rightarrow 2(l+b)(h+4)$

Teacher's Signature ....

Subject .... DATE __/__/__

MON TUE WED THU FRI SAT SUN

$= 2(24+12)(17+4)$

$= 2(36)(21)$ cm^2

$= 1512$ cm^2 Ans

(iii) (b) Space available inside the lamp =

Volume of the cuboid $\Rightarrow l \times b \times h$.

$\Rightarrow 24 \times 12 \times 17$ cm^3

$\Rightarrow 4896$ cm^3 Ans

Teacher's Signature ....