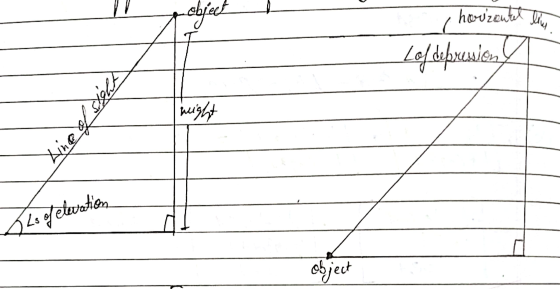
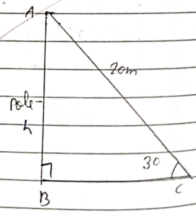
Chapter ⇒ 9

Some Applications of Trigonometry



Ex - 9.1



Q-1- Let height of Pole is h m

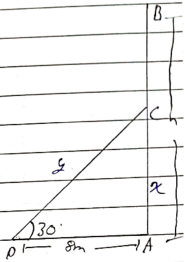
In $\triangle ABC$

$$\sin 30 = \frac{P}{H}$$

$$\frac{1}{\cancel{2}} = \frac{h}{\cancel{20}_{10}}$$

$$\boxed{h = 10m}$$

Let heigh of tree = h m



In Δ CBA

$$\tan 30 = \frac{P}{B}$$

$$\frac{1}{\sqrt{3}} = \frac{x}{8}$$

$$x = \frac{8 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{8\sqrt{3}}{3}$$

$$\boxed{x = \frac{8\sqrt{3}}{3} m}$$

In Δ CDA

$$\cos 30 = \frac{B}{H}$$

$$\frac{\sqrt{3}}{2} = \frac{8}{y}$$

$$y = \frac{16 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{16\sqrt{3}}{3}$$

$$\boxed{y = \frac{16\sqrt{3}}{3} m}$$

heigh of tree = h = x+y

$$= \frac{8\sqrt{3}}{3} + \frac{16\sqrt{3}}{3}$$

$$= \frac{\overset{8}{\cancel{24}}\sqrt{3}}{\cancel{3}}$$

$$\boxed{h = 8\sqrt{3} m}$$

Q.3- In ΔBCD

$$\sin 30 = \frac{P}{H}$$

$$\frac{1}{2} = \frac{1.5}{BD}$$

$$\boxed{BD = 3m}$$

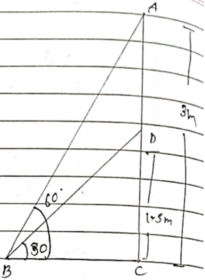
In ΔABC

$$\sin 60 = \frac{P}{H}$$

$$\frac{\sqrt{3}}{2} = \frac{3}{AB}$$

$$AB = \frac{6 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\cancel{6}^{2}\sqrt{3}}{\cancel{3}}$$

$$\boxed{AB = 2\sqrt{3}\,m}$$



Q 4- Let height of tower be (hm)

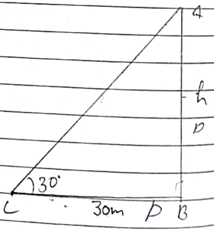
In ΔABC

$$\tan 30 = \frac{h}{30}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{30}$$

$$h = \frac{30 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\cancel{30}^{10}\sqrt{3}}{\cancel{3}}$$

$$\boxed{h = 10\sqrt{3}\,m}$$



$$S = \frac{P}{H} \qquad C = \frac{B}{H} \qquad T = \frac{P}{B}$$

Cosec Sec Cot

5. Let the length of String = x m

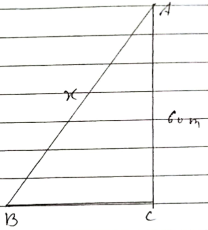
In Δ ABC

$$\sin 60 = \frac{P}{H}$$

$$\frac{\sqrt{3}}{2} = \frac{60}{x}$$

$$x = \frac{120 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\cancel{120}^{40}\sqrt{3}}{\cancel{3}}$$

$$\boxed{x = 40\sqrt{3}\,m}$$



6. In Δ ABD

$$\tan 30 = \frac{AB}{BD}$$

$$\frac{1}{\sqrt{3}} = \frac{28.5}{BD}$$

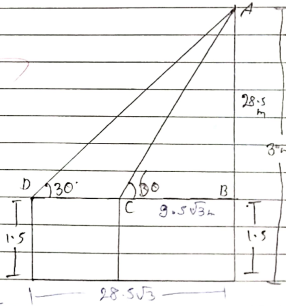
$$\boxed{BD = 28.5\sqrt{3}\,m}$$

In Δ ABC

$$\tan 60 = \frac{AB}{BC}$$

$$\sqrt{3} = \frac{28.5}{BC}$$

$$BC = \frac{28.5 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\cancel{28.5}^{9.5}\sqrt{3}}{\cancel{3}}$$



$$\boxed{BC = 9.5\sqrt{3}\,m}$$

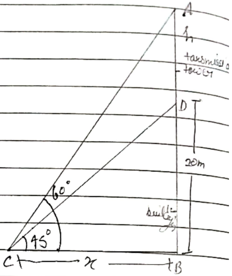
The distance he walked

$$CD = BD - BC$$

$$= 28.5\sqrt{3} - 9.5\sqrt{3}$$

$$CD = 19\sqrt{3}\,m$$

Q-7 In Δ ABDC



$\tan 45° = \frac{P}{B}$

$1 = \frac{20}{x}$

$\boxed{x = 20m}$

In Δ ABC

$\tan 60 = \frac{P}{B}$

$\sqrt{3} = \frac{20+h}{20}$

$20\sqrt{3} = 20+h$

$h = 20\sqrt{3} - 20$

$\boxed{h = 20(\sqrt{3}-1)m}$

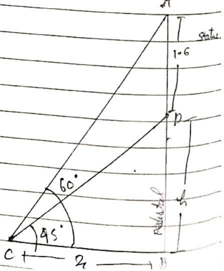
Q-8 In ~~Δ~~ Let the height of pedestal = h m

In Δ BCD

$\tan 45 = \frac{P}{B}$

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

$\boxed{x = h}$ — (1)



In Δ ABC

$\tan 60 = \frac{P}{B}$

$\sqrt{3} = \frac{h+1\cdot6}{x}$

$\sqrt{3} = \frac{h+1.6}{h}$ (using (1))

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$h\sqrt{3} - h = 1.6$

$h(\sqrt{3}-1) = 1.6$

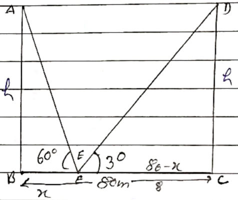
$$h = \frac{1.6 \times (\sqrt{3}+1)}{(\sqrt{3}-1)\times(\sqrt{3}+1)} = \frac{1.6(\sqrt{3}+1)}{3-1}$$

$$h = \frac{\cancel{1.6}^{0.8}(\sqrt{3}+1)}{\cancel{2}} = 0.8(\sqrt{3}+1)\,m$$

Let height of Poles = h

& $BE = x$

then $DE = 80 - x$



In $\triangle AEB$

$\tan 60 = \frac{P}{B}$

$\sqrt{3} = \frac{h}{x}$

$\boxed{h = x\sqrt{3}}$ — ①

In $\triangle CED$

$\tan 30 = \frac{h}{80-x}$

$\frac{1}{\sqrt{3}} = \frac{h}{80-x}$

$h\sqrt{3} = 80 - x$ using ①

$x\sqrt{3}\times\sqrt{3} = 80 - x$

$3x = 80 - x$

$4x = 80$

$\boxed{x = 20m}$

On putting the value of x in eqn ①

$\boxed{h = 20\sqrt{3}}$

Distance of pt. from the pole $AB = x = 20m$

Distan of pt from the Pole $= CD = 80 - x = 80 - 20$
$= 60m$

& height of pole $= 20\sqrt{3}m$ each.

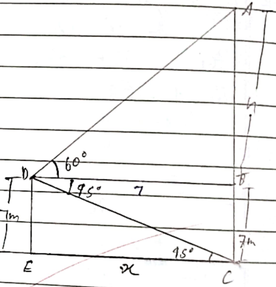
Let Base $(EC) = x$ & $AB = h$

In ΔDEC

$\tan 45^\circ = \frac{DE}{EC}$

$1 = \frac{7}{x}$

$\boxed{x = 7m} = DB$



In ΔADB

$\tan 60 = \frac{h}{7}$

$\sqrt{3} = \frac{h}{7}$

$\boxed{h = 7\sqrt{3} m}$

height of tower $AC = AB + BC$

$= 7\sqrt{3} + 7$

$= \cancel{14\sqrt{3}}$

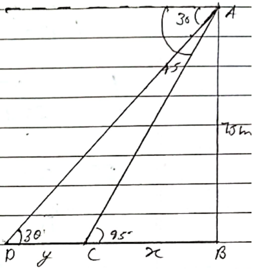
$AC = 7(\sqrt{3} + 1) m$

In Δ ACB

$$\tan 45 = \frac{AB}{x}$$

$$1 = \frac{75}{x}$$

$$\boxed{x = 75m}$$



In Δ ADB

$$\tan 30 = \frac{75}{y+x}$$

$$\frac{1}{\sqrt{3}} = \frac{75}{y+75}$$

$$y + 75 = 75\sqrt{3}$$

$$y = 75\sqrt{3} - 75$$

$$\boxed{y = 75(\sqrt{3}-1)\,m}$$

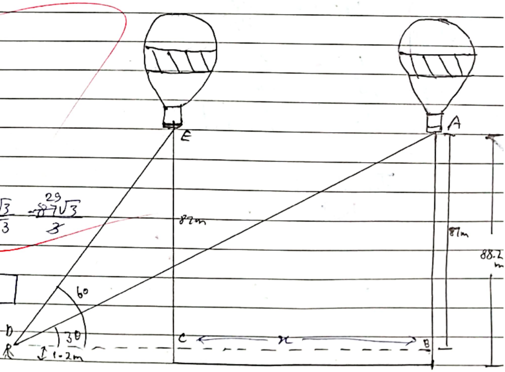
In Δ DEC

$$\tan 60 = \frac{CE}{CD}$$

$$\sqrt{3} = \frac{87}{CD}$$

$$CD = \frac{87 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} \quad \frac{\overset{29}{\cancel{87}}\sqrt{3}}{\cancel{3}}$$

$$\boxed{CD = 29\sqrt{3}\,m}$$



In Δ ABD

$$\tan 30 = \frac{AB}{BD}$$

$$\frac{1}{\sqrt{3}} = \frac{87}{29\sqrt{3}+x}$$

$$29\sqrt{3}+x = 87\sqrt{3}$$

$$x = 87\sqrt{3} - 29\sqrt{3}$$

$$\boxed{x = 58\sqrt{3}\,m}$$

distance travelled by balloon = $58\sqrt{3}m$

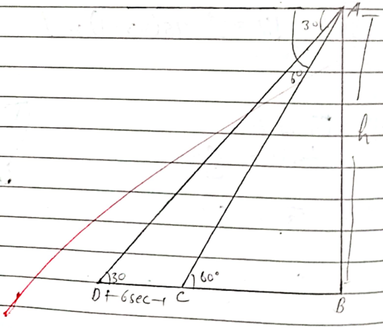
Let height of tower = h

In Δ ABD

$$\tan 30 = \frac{AB}{BD}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{BD}$$

$$\boxed{BD = h\sqrt{3}\,m}$$



In Δ ABC

$$\tan 60 = \frac{AB}{BC}$$

$$\sqrt{3} = \frac{h}{BC}$$

$$BC = \frac{h}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{h\sqrt{3}}{3}$$

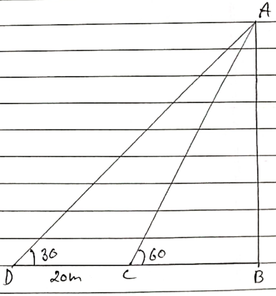
$$\boxed{BC = \frac{h\sqrt{3}}{3}}$$

$$CD = BD - BC$$
$$= h\sqrt{3} - \frac{h\sqrt{3}}{3}$$
$$= \frac{3h\sqrt{3} - h\sqrt{3}}{3}$$
$$\boxed{CD = 2\left(\frac{h\sqrt{3}}{3}\right)}$$
$$CD = 2 \times BC$$

time taken in $BC = \frac{1}{2}$ time taken in CD

$$= \frac{1}{\cancel{2}} \times 6\,3$$
$$= 3\,sec$$

Q-11 In $\Delta\ ADB$



$$\tan 30 = \frac{AB}{BD}$$
$$\frac{1}{\sqrt{3}} = \frac{AB}{20 + BC}$$
$$\boxed{AB = \frac{20+BC}{\sqrt{3}}} \quad -(i)$$

In $\Delta\ ACB$
$$\tan 60 = \frac{AB}{BC}$$
$$\sqrt{3} = \frac{AB}{BC}$$
$$\boxed{AB = \sqrt{3}BC} \quad -(ii)$$

From eqⁿ 1 & 11.

$$\sqrt{3}\,BC = \frac{20 + BC}{\sqrt{3}}$$

$$3\,BC = 20 + BC$$

$$2\,BC = 20$$

$$\boxed{BC = 10m}$$

putting the value of BC in eqⁿ 11

$$\boxed{AB = 10\sqrt{3}\,m}$$

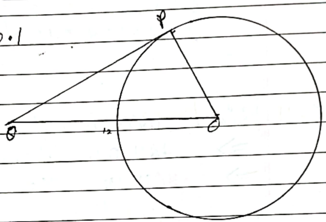
Height of the tower = $10\sqrt{3}\,m$
& width of canal = $10m$

08/09/23

Chapter => 10

Circles

Ex - 10.1



In ΔOPQ

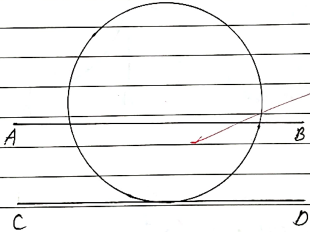
By PGT

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

$PQ^2 + 5^2 = (12)^2$

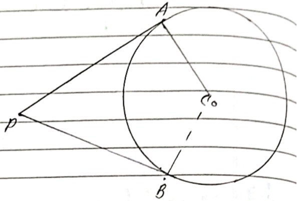
$PQ^2 = 144 - 25$

$\boxed{PQ = \sqrt{119} \text{ cm}}$



Ex 10.2

Q-10 $\angle PAO = \angle PBO = 90^\circ$ ($\angle$ b/w radius & tangent)



By $\angle$s sum of Quad. PAOB

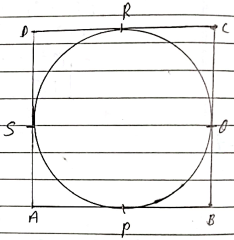
$\angle APB + \angle AOB + \angle PAO + \angle PBO = 360$

$\angle APB + \angle AOB + 90 + 90 = 360^\circ$

$\angle APB + \angle AOB = 360 - 180^\circ$

$\boxed{\angle APB + \angle AOB = 180^\circ}$

Q-11 Given ABCD is a ||gm



$\Rightarrow$ $AB \parallel DC$, $AB = DC$

$\Rightarrow$ $BC \parallel AD$, $BC = AD$

To prove ABCD is a rhombus

Proof from fig.

$AP = AS$ (Tangent drawn from external --- of a circle are equal)

Similarly $BP = BQ$

$CR = CQ$

$DR = DS$

adding all above, we get

$AP + BP + CR + DR = AS + DS + BQ + CQ$

$AB + CD = AD + BC$

$AB + AB = BC + BC$ — (1)

$2AB = 2BC$

$\boxed{AB = BC}$

$\Rightarrow$ $AB = BC = CD = AD$

$\Rightarrow$ ABCD is a rhombus.

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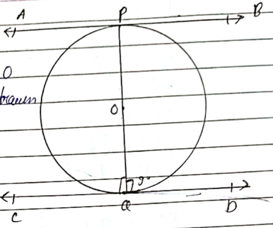
Q-4- $\boxed{\text{To prove}}$ AB ∥ CD



$\boxed{\text{Given}}$ A circle having centre O
AB & CD are two tangents drawn
at the end of diameters.

$\boxed{\text{Proof}}$

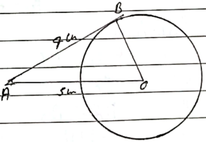
$\angle OPB = 90°$
$\angle OQD = 90°$
] ∠ b/w. tangent and radius.

$\angle OPB + \angle OQD = 90 + 90$
$= 180°$

AB & CD is lines are intersected by PQ transversal
$\angle OPB + \angle OQD = 180°$
(Interior ∠ on the same side of transversal)

$\boxed{AB \parallel CD}$ Proved.

Q-6- In △
$\boxed{\text{Given}}$ AB = 4cm , AO = 5cm
, BO = ?



In △AOB using PGT

$(AO)^2 = (AB)^2 + (BO)^2$
$(5)^2 = (4)^2 + (BO)^2$
$25 = 16 + BO^2$
$25 - 16 = BO^2$
$BO = \sqrt{9}$
$\boxed{BO = 3cm}$

Therefore radius of circle is 3 cm.

Q7- Given $OM = 3cm$, $OP = 5cm$

In ΔPOM using PGT

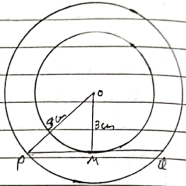
$(OP)^2 = (OM)^2 + (PM)^2$

$(5)^2 = (3)^2 + (PM)^2$

$25 - 9 = PM^2$

$PM = \sqrt{16}$

$\boxed{PM = 4cm}$

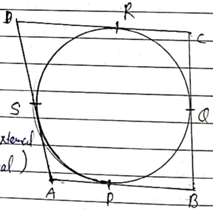


$PQ = 2PM$
$PQ = 2 \times 4$
$PQ = 8cm$

[⊥ drawn from the centre bisects the Chord.]

Q-8. Given ABCD is a quadrilateral

To prove $AB + CD = AD + BC$



Proof In fig

$AP = AS$ (Tangents drawn from external Point on a circle are equal)

similarly

$BP = BQ$

$CR = CQ$

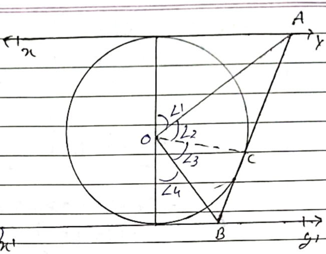
$DR = DS$

adding all of above we get

$AP + BP + CR + DR = AS + DS + BQ + CQ$

$\boxed{AB + CD = AD + BC}$

To Prove $\angle AOB = 90^\circ$



Construction Join OC

Proof In $\triangle APO$ & $\triangle ACO$

$OA = OA$ (Common)
$OP = OC$ (radii of same circle)
$AP = AC$ (Theorem 10.2)

$\triangle APO \cong \triangle ACO$ by SSS Congruency

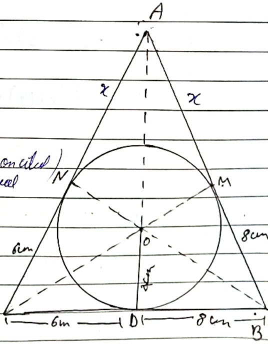
$\boxed{\angle 1 = \angle 2 \text{ (By CPCT)}}$

Similarly
$\angle 3 = \angle 4$ (In $\triangle BOO \cong \triangle BCO$)

Now
$\angle 1 + \angle 2 + \angle 3 + \angle 4 = 180^\circ$ ($\angle$ sum property)
$\angle 2 + \angle 2 + \angle 3 + \angle 3 = 180^\circ$
$2\angle 2 + 2\angle 3 = 180$
$\cancel{2}(\angle 2 + \angle 3) = \cancel{180}\ 90$
$\angle 2 + \angle 3 = 90^\circ$

$\boxed{\angle AOB = 90}$

~~Let~~ $AM = AN$ (tangent draw from ex. pt. on circle are equal) $= x$ (let)



Given
$BM = BD = 8cm$
$CN = CD = 6cm$

area of Δ ABC = ar. (AOC) + ar. (BOC) + ar. (AOB)

$= \frac{1}{2} \times B \times H + \frac{1}{2} \times B \times H + \frac{1}{2} \times B \times H$

$= \frac{1}{\cancel{2}} \times (x+6) \times \cancel{4}^{2} + \frac{1}{\cancel{2}} \times 14 \times \cancel{4}^{2} + \frac{1}{\cancel{2}} \times (x+8) \times \cancel{4}^{2}$

$= 2x + 12 + 28 + 2x + 6$

$= (4x + 56)$

area of Δ ABC $= \boxed{4(x+14)\ cm^2}$ — (1)

AB = $(x+8)$ cm

BC = 14 cm

CA = $(x+6)$ cm

$S = \frac{a+b+c}{2} = \frac{x+8+14+x+6}{2} = \frac{2x+28}{2} = (x+14)$

area (ABC) using herons formula

$= \sqrt{S(S-a)(S-b)(S-c)}$

$= \sqrt{(x+14)(\cancel{x}+14-\cancel{x}-8)(x+\cancel{14}-\cancel{14})(\cancel{x}+14-\cancel{x}-6)}$

$= \sqrt{(x+14) \times 6 \times x \times 8}$ — (11)

eq^n (1) = eq^n (11)

$4(x+14) = \sqrt{6 \times 8x (x+14)}$ squaring both side

$\cancel{16}^{2}(x+14)^{\cancel{2}} = \cancel{6}^{3} \times \cancel{8}x \cancel{(x+14)}$

$x + 14 = 3x$

$2x = 14$

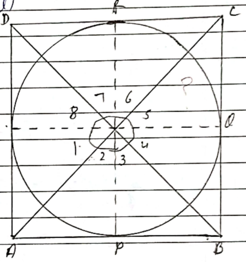
$\boxed{x = 7}$

Therefore

$AB = x+8 = 7+8 = 15cm$

$AC = x+6 = 7+6 = 13cm$

Q-13 In ΔAOS & ΔAOP



$AP = AS$ (tangent drawn from external Points are equal)

$OP = OS$ (radius)

$OA = OA$ (common)

By SSS congruency

$\Delta AOS \cong \Delta AOP$

$\angle 1 = \angle 2$ (by CPCT)

Similarly,

$\angle 3 = \angle 4$

$\angle 5 = \angle 6$

$\angle 7 = \angle 8$

$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 = 360°$

$\angle 2 + \angle 2 + \angle 3 + \angle 3 + \angle 6 + \angle 6 + \angle 7 + \angle 7 = 360°$

$\cancel{2}(\angle 2 + \angle 3 + \angle 6 + \angle 7) = \cancel{360}\ 180$

$\boxed{\angle AOB + \angle COD = 180°}$

18/09/23

Chapter ⇒ 11
Area Related to Circle

① Area of minor sector = $\frac{\theta}{360^\circ} \times \pi r^2$

Ex-11.1

Q-1 Area of minor sector $= \frac{\theta}{360} \times \pi r^2$

$= \frac{\cancel{60}}{\cancel{360}_{6}} \times \frac{22}{7} \times \cancel{6} \times 6$

$= \frac{132}{7}\ cm^2$

$r = 6$
$\theta = 60$

Q-2- Cir. of circle = 22cm

$2\pi r = 22$

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

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

$\boxed{r = \frac{7}{2}\ cm}$

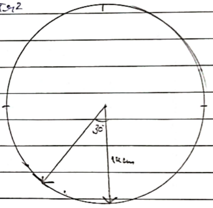
Area of quadrant of a circle $= \frac{1}{4} \times \pi r^2$

$= \frac{1}{4} \times \frac{\cancel{22}^{11}}{\cancel{7}} \times \frac{\cancel{7}}{\cancel{2}} \times \frac{7}{2}$

$= \frac{77}{8} \text{ cm}^2$

Q-3. Area swept by min. hand in 5 min $= \frac{\theta}{360} \times \pi r^2$

$= \frac{\cancel{30}}{\cancel{360}_{12}} \times \frac{22}{7} \times (14)^2$

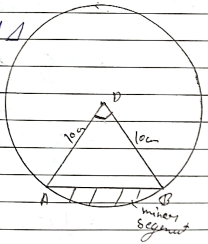


$= \frac{1}{\cancel{12}_{6}} \times \frac{22}{\cancel{7}} \times \cancel{14}^{2} \times \cancel{14}^{7}$

$= \frac{154}{3} \text{ cm}^2$

Q-4 (i) Area of minor seg. = Area of sector − Area of Δ

$= \frac{\theta}{360} \times \pi r^2 - \frac{1}{2} \times B \times H$



$= \frac{\cancel{90}^{1}}{\cancel{360}_{4}} \times 3.14 \times (10)^2 - \frac{1}{\cancel{2}} \times \cancel{10}^{5} \times 10$

$= \frac{1}{4} \times 3.14 \times 100 - 50$

$= \frac{314}{4} - 50$

$= \frac{157}{2} - 50$

$= \frac{157-100}{2} = \frac{57}{2} = 28.5 \text{ cm}^2$

(ii) Area of major sector $= \left(\frac{360^\circ - \theta}{360^\circ}\right) \times \pi r^2$

$= \frac{360 - 90}{360} \times 3.14 \times (10)^2$

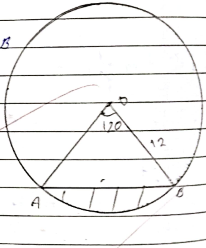
$= \frac{27\cancel{0}}{36\cancel{0}} \times 3.14 \times 100$

$= \frac{3}{4} \times 314$

$= 3 \times \frac{157}{2}$

$= \frac{471}{2} = 235.5 \text{ cm}^2$

Q-7 Area of minor segment = Ar. of sec. − Ar. of $\triangle AOB$



$= \frac{\theta}{360} \times \pi r^2 - \frac{1}{2} r^2 \sin\theta$

$= \frac{\overset{1}{\cancel{120}}}{\underset{3}{\cancel{360}}} \times 3.14 \times (12)^2 - \frac{1}{2} \times (12)^2 \times \sin 120^\circ$

$= \frac{1}{\cancel{3}} \times 3.14 \times \overset{48}{\cancel{144}} - \frac{1}{2} \times 144 \times \frac{\sqrt{3}}{2}$

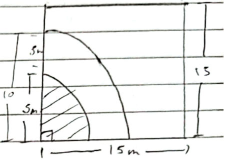
$= 3.14 \times 48 - \overset{36}{\cancel{72}} \times \frac{\sqrt{3}}{\cancel{2}}$

$= 150.72 - 36 \times 1.73$

$= 150.72 - 62.28$

$= 88.44 \text{ cm}^2$

Q8 (i) Area of the part of field in which horse can graze = Area of quadrant.



$= \frac{1}{4} \times \pi r^2$

$= \frac{1}{\cancel{4}_2} \times \overset{1.57}{\cancel{3.14}} \times 5 \times 5$

$= \frac{1}{2} \times 1.57 \times 25$

$= \frac{39.25}{2} = 19.625\ cm^2$

(ii) Grazing Area if rope 10m $= \frac{1}{4} \times 3.14 \times (10)^2$

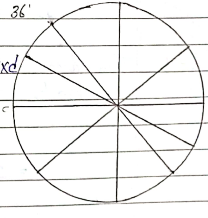
$= \frac{1}{4} \times 3.14 \times 100$

$= \frac{314}{4} = 78.5 m^2$

Increase in grazing area if the rope were 10m long instead of 5m $= 78.5 - 19.625$

$= 58.875\ m^2$

Q-9 - $d = 35mm$ $r = \frac{35}{2} mm$ $\theta = \frac{360}{10} 36'$



(i) Length of wire used in brooch = cir. of circle + 5xd

$= 2\pi r + 5d$

$= \cancel{2} \times \frac{22}{\cancel{7}} \times \frac{\cancel{35}^5}{\cancel{2}} + 5 \times 35$

$= 110 + 175$

$= 285\ mm$

(ii) Area of each sector of Broach = $\frac{\theta}{360} \times \pi r^2$

$= \frac{\cancel{36}^{1}}{\cancel{360}_{10}} \times \frac{\cancel{22}^{11}}{\cancel{7}} \times \frac{\cancel{35}^{5}}{\cancel{7}} \times \frac{35}{2}$

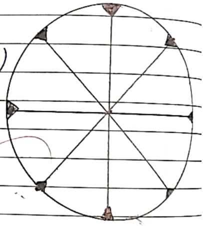
$= \frac{11 \times 175}{10 \times 2}$

$= \frac{1925}{10 \times 2}$

$= 96.25 mm^2$

Q-10 $r = 45 cm$ $\theta = \frac{360}{8} = 45°$

Area b/w two consecutive ribs (Ar. of sec.)

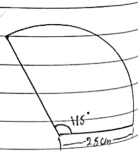


$= \frac{\theta}{360} \times \pi r^2$

$= \frac{\cancel{45}}{\cancel{360}_{\cancel{8}_4}} \times \frac{\cancel{22}^{11}}{7} \times (45)^2$

$= \frac{11 \times 45 \times 45}{28} = \frac{22275}{28} cm^2$

Q-11 Total Area cleaned at each sweep of the blades $= 2 \times \left[\frac{\theta}{360} \times \pi r^2\right]$



$= 2\left[\frac{\cancel{115}^{23}}{\cancel{360}_{72}} \times \frac{22}{7} \times (25)^2\right]$

$$= 2\times\left[\frac{23}{\cancel{72}_{36}}\times\frac{\cancel{22}^{11}}{7}\times 625\right]$$

$$= \frac{2\times 23\times 11\times 625}{\cancel{36}_{18}\times 7} = \frac{23\times 11\times 625}{18\times 7}$$

$$= \frac{158125}{126}\ cm^2$$

Q-12 $r = 16.5 km$ $\theta = 80^\circ$

Area of the sea over which the ships are warned

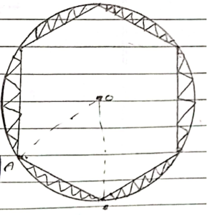
$$= \frac{\theta}{360}\times\pi r^2$$

$$= \frac{2\times\cancel{80}}{\cancel{360}_{\cancel{18}\,\cancel{9}}}\times 3.14\times\cancel{16.5}^{5.5}\times\cancel{16.5}^{5.5}$$

$$= 2\times 3.14\times 30.25$$

$$= 189.97\ Km^2$$

Q-13 $r = 28 cm$ $\theta = \frac{360}{6} = 60^\circ$



Area of 6 equal designs $= 6\times\left[\frac{\theta}{360}\times\pi r^2 - \frac{1}{2}r^2\sin 60\right]$

$$= 6\times\left[\frac{\cancel{60}}{\cancel{360}_6}\times\frac{22}{\cancel{7}}\times\cancel{28}^{4}\times 28 - \frac{1}{\cancel{2}}\times\cancel{28}^{\cancel{14}\,7}\times 28\times\frac{\sqrt{3}}{\cancel{2}}\right]$$

$$= 6\left[\frac{1}{\cancel{6}_3}\times\cancel{22}^{11}\times 4\times 28 - 7\times 28\times 1.7\right]$$

$= \frac{2}{6}\left[\frac{44 \times 28}{\cancel{3}} - 6 \times 196 \times 1.7\right]$

$= 88 \times 28 - 1176 \times 1.7$

$= 2464 - 1999.2$

$= 464.8 \text{ cm}^2$

Cost of making the design

$= ₹\ 0.35 \times 464.8$

$= ₹\ 162.680$

$4a^2$

$6a^2, a^3$

$2(l+b)h$

$2(lb+bh+hl)$

$(l \times b \times h)$

$\pi rl, \pi r(l+r)$ $\frac{1}{3}\pi r^2 h$

$\frac{1}{\alpha^2} + \frac{\beta^2}{\beta^2}$

$\frac{(\alpha^2+\beta^2)}{\alpha^2 \cdot \beta^2}$

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

$(\alpha\beta)^3$

$\frac{1}{\alpha^2} - \frac{1}{\beta^2}$

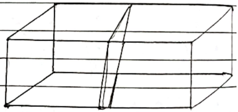
Chapter => 12
Surface Area & Volume

- TSA of cuboid = $2(lb + bh + hl)$
- C.S.A of Cuboid = $2(l+b)h$
- T.S.A of Cube = $6a^2$
- C.S.A. of Cube = $4a^2$
- T.S.A of Cyl^r = $2\pi r(h+r)$
- C.S.A of cyl^r = $2\pi rh$
- T.S.A of Cone = $\cancel{\pi r(l+r)}$ $\pi rl + \pi r^2$
- C.S.A of Cone = πrl ✓
- T.S.A of sphere = $4\pi r^2$
- C.S.A of sphere = $4\pi r^2$
- TSA of hemisphere = $3\pi r^2$
- CSA of hemisphere = $2\pi r^2$

- Volume of cuboid = $l \times b \times h$
- Volume of cone = $\frac{1}{3}\pi r^2 h$
- Volume of cube = a^3
- Volume of cyl^n = $\pi r^2 h$
- Volume of sphere = $\frac{4}{3}\pi r^3$
- Volume of hemisphere = $\frac{2}{3}\pi r^3$

Ex- 12.1

Q-1- vol. of cube $= 64\ cm^3$



$a^3 = 64$

$a = \sqrt[3]{64}$

$\boxed{a = 4}$

Cuboid

$l = a + a = 4 + 4 = 8$

$b = a = 4$

$h = a = 4$

S.A of cuboid $= 2(lb + bh + hl)$

$= 2(8 \times 4 + 4 \times 4 + 4 \times 8)$

$= 2(32 + 16 + 32)$

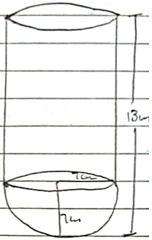
$= 2 \times 80$

$= 160\ cm^2$

Q.2 $d = 14cm$ $r = 7cm$

Height of cyl^{r} $= h = 13-7 = 6cm$

Inner surface area of vessel = CSA of cyl^{n} + CSA of hemisphere



$= 2\pi r^2 + 2\pi rh$

$= 2\pi r(r+h)$

$= 2 \times \frac{22}{\cancel{7}} \times \cancel{7}(7+6)$

$= 44 \times 13$

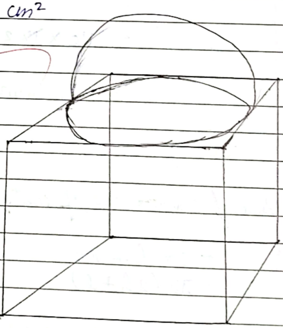
$= 572 \ cm^2$

Q.4 side of cubical block = 7m

Dia of circular base of hemisphere = side of block

$d = 7m$

$r = 7/2 \ m$



S.A of solid = (TSA of cubical − area of cir. base) + CSA of hemisphere.

$= 6a^2 - \pi r^2 + 2\pi r^2$

$= 6a^2 + \pi r^2$

$= 6(7)^2 + \frac{\overset{11}{\cancel{22}}}{\cancel{7}} \times \frac{\cancel{7}}{2} \times \frac{7}{\cancel{2}}$

$= 6 \times 49 + \frac{77}{2}$

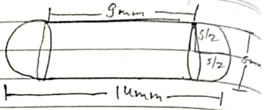
$= 294 + 38.5$

$= 332.5 \ cm^2$

Q-6. $r = 5/2$ mm

Height of cyl^r $= 14 - 5$

$= 9$ mm



S.A. of capsule = CSA of cyl^r + 2 × CSA of hemisphere

$= 2\pi rh + 2\times 2\pi r^2$

$= 2\pi rh + 4\pi r^2$

$= 2\pi r(h + 2r)$

$= 2\times\frac{22}{7}\times\frac{5}{\cancel{2}}\left(9 + \cancel{2}\times 5/\cancel{2}\right)$

$= \frac{110}{\cancel{7}}\times\cancel{7}\times 2$

$= 220\ mm^2$

Q-7. $r = \frac{4}{2} = 2m$

Area of canvas = CSA of cyl^r part + CSA of conical part

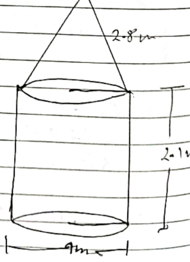
$= 2\pi rh + \pi rl$

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

$= \frac{22}{7}\times 2\,(2\times 2.1 + 2.8)$

$= \frac{44}{\cancel{7}}\times\cancel{7}$

$= 44\ m^2$



Cost of canvas = ₹ 500 × 44

= ₹ 22000

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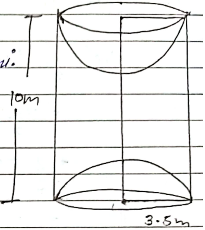
Q9. $r = 3.5m$ $h = 10cm$



S.A of Article = C.S.A of cyl^r + 2 CSA of hemi.

$= 2\pi rh + 2\times 2\pi r2$

$= 2\pi r(h + 2r)$

$= 2 \times \frac{22}{7} \times \frac{\cancel{35}^{5}}{10}(10 + 2\times 3.5)$

$= \frac{\cancel{44}^{22}}{\cancel{2}} \times \frac{\cancel{5}}{\cancel{10}_{\cancel{5}}} \times 17$

$= 22 \times 17$

$= 374\ m^2$

3/10/23

Ex 12.2

Q-1- $r = 1\,cm$ $\quad h = r = 1\,cm$

Vol. of solid = vol. of hemisphere + vol. of cone

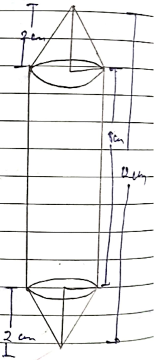
$= \frac{2}{3}\pi r^3 + \frac{1}{3}\pi r^2 h$

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

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

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

$= \pi\,cm^3$



Q-2 $d = 3\,cm$

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

Height of cone $= h = 2\,cm$

$r = 3/2\,cm$

Height of clyn $= H = 8\,cm$

$r = 3/2\,cm$

Vol. of air contained in Model =

vol. of cylinder + 2 × vol. of cone

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

$= \pi r^2 \left[H + \frac{2}{3} h \right]$

$$= \frac{22}{7} \times \left(\frac{3}{2}\right)^2 \cdot \left[8 + \frac{2}{3} \times 2\right]$$

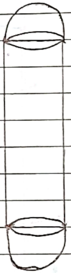
$$= \frac{22}{7} \times \frac{9}{4} \cdot \left[\frac{24+4}{3}\right]$$

$$= \frac{22}{\cancel{7}} \times \frac{\cancel{9}^{\,3}}{\cancel{4}} \times \frac{\cancel{28}^{\,4}}{\cancel{3}}$$

$$= 66\ cm^3$$

Q.3 $d = 2.8\ cm$

$r = 1.4\ cm$



Height of cyl^r part $= 5 - (1.4 + 1.4)$

$= 5 - 2.8$

$H = 2.2\ cm$

vol. of a Gulab Jamun = vol. of cyl^n part + 2 vol. of a hemi. part.

$$= \pi r^2 H + 2 \times \frac{2}{3}\pi r^3$$

$$= \pi r^2 \left[H + \frac{4}{3} r\right]$$

$$= \frac{22}{7} \times (1.4)^2 \left[2.2 + \frac{4}{3} \times 1.4\right]$$

$$= \frac{22}{\cancel{7}} \times \cancel{1.4}^{\,0.2} \times 1.4 \left[\frac{6.6 + 5.6}{3}\right]$$

$= \frac{22}{7} \times 0.28 \times \frac{12.2}{3} \ cm^3$

vol. of sugar syrup contained in one Gulab Jamun 30% of vol. of a Gulab Jamun.

$= \frac{\cancel{30}}{10\cancel{0}} \times 22 \times 0.28 \times \frac{12.2}{\cancel{3}}$

$= \frac{.22 \times 0.28 \times 12.2}{10}$

Therefore

vol. of sugar syrup contained in 45 Gulab Jamun

$= \frac{\overset{9}{\cancel{45}} \times \overset{11}{\cancel{22}} \times 0.28 \times 12.2}{\cancel{10}\ \cancel{2}}$

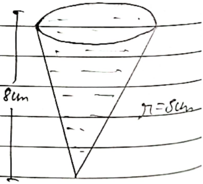
$= 99 \times 0.28 \times 12.2$

$= 338.184 \ cm^3$

15 For conical vessel

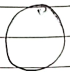
$H = 8cm$

$R = 5cm$



For spherical lead shot

$r = 0.5cm$



vol. of water in vessel $= \frac{1}{3} \pi R^2 H$

$= \frac{1}{3} \times \pi \times (5)^2 \times 8$

$= \frac{1}{3} \times \pi \times 25 \times 8$

$= \frac{200\pi}{3} \cdot cm^3$

Vol. of water flow out $= \frac{1}{4} \times$ vol. of water in vessel

$= \frac{1}{\cancel{4}} \times \frac{\overset{50}{\cancel{200}}}{3} \pi$

$= \frac{50}{3}\pi \ cm^3$

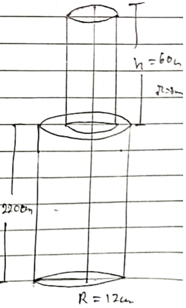
No. of lead short $= \frac{\text{vol. of water flow out}}{\text{vol. of shot}}$

$= \frac{\frac{50\cancel{\pi}}{\cancel{3}}}{\frac{4}{\cancel{3}}\cancel{\pi} r^3} = \frac{.50}{4 \times (0.5)^3}$

$= \frac{\overset{10000}{\cancel{.50000}}}{\cancel{4} \times 0.\cancel{125}}$ ~~2000~~ ~~400~~ 100

$\boxed{= 100}$

Q. 6 - $H = 220cm$, $R = 12cm$



Vol. of whole pole = vol. of greater clyn + vol. of smaller cylin

$= \pi R^2 H + \pi r^2 h$

$= \pi [R^2 H + r^2 h]$

$= 3.14 [(12)^2 \times 220 + (8)^2 \times 60]$

$$= 3.14 \times 144 \times 220 + 64 \times 60$$
$$= 3.14 \times 31680 + 3840$$
$$= 3.14 \times 35520 \ cm^3$$

Vol. of pole $= 3.14 \times 35520 \times 8 \ g$
$$= 892262.4 \ g$$
$$= \frac{892262.4}{1000} \ kg$$
$$= 892.2624 \ kg$$

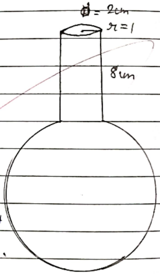
Q.8. $D = 8.5 \ cm$

$R = \frac{8.5}{2} \ cm = \frac{17}{4}$

for cylindrical part

$h = 8 cm$

$r = 1 cm$



vol. of water in vessel = vol. of spherical part + vol. of cyl^n part.

$$= \frac{4}{3}\pi R^3 + \pi r^2 h$$
$$= \frac{4}{3} \times \pi \times \left(\frac{17}{4}\right)^3 + \pi \times (1)^2 \times 8$$
$$= \frac{4}{3} \times 3.14 \times \frac{4913}{64} + 3.14 \times 8$$

1.57 16 8

$= \frac{1.57 \times 4913}{24} + 25.12$

$= \frac{7713.41}{24} + 25.12$

$= 321.39 + 25.12$

$= 346.51 \ cm^3$

She is not correct , correct Answer is $346.51 cm^3$

8/10

Chapter => 13

Statistics

Direct Method.

(1) $\boxed{\text{Mean} = \frac{\text{Sum of observation}}{\text{no. of observation}}}$

$$\boxed{\text{Mean} = \frac{x_1 + x_2 + x_3 --- x_n}{n} = \frac{\sum_{i=1}^{n} x_i}{n}}$$

Assume mean method :-

$$\boxed{\text{Mean} - \frac{\Sigma fd}{\Sigma f} + A}$$

Step deviation method :-

$$\boxed{\text{Mean} = A + \left(\frac{\Sigma fu}{\Sigma f}\right) \times h}$$

Ex - 13.1

Q-1.

C.I	No. of houses f	Class mark	fx
0-2	1	1	1
2-4	2	3	6
4-6	1	5	5
6-8	5	7	35
8-10	6	9	54
10-12	2	11	22
12-14	3	13	39
	$\Sigma f = 20$	Total	$\Sigma fx = 162$

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{162}{20}$$

$$\boxed{\text{Mean} = 8.1}$$

Q-2.

Daily wages (in ₹)	No. of workers	CM	$d = x - a$	fd
500-520	12	510	510-550 = -40	-480
520-540	14	530	-20	-280
540-560	18	a= 550	0	0
560-580	6	570	20	120
580-600	10	590	40	400
	$\Sigma f = 50$			$\Sigma fd = -240$

Assume mean method $= a + \frac{\Sigma fd}{\Sigma f}$

$$= 550 + \left(\frac{-\cancel{240}^{4.8}}{\cancel{50}}\right)$$

$$= 550 - 4.8$$

$$= 545.2$$

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Q-3- mean = 18

Class Interval	f	x	fx
11 - 13	7	12	84
13 - 15	6	14	84
15 - 17	9	16	144
17 - 19	13	18	234
19 - 21	f	20	20f
21 - 23	5	22	110
23 - 25	4	24	96
Total.	44+f		752+20f

$$\text{mean} = \frac{\Sigma fx}{\Sigma f}$$

$$18 = \frac{752+20f}{44+f}$$

$$792 + 18f = 752 + 20f$$

$$18f - 20f = 752 - 792$$

$$\cancel{-}2f = \cancel{-}40$$

$$\boxed{f = 20}$$

Q-5

No. of mangoes	C. I	f	x	$U = \frac{x-a}{h}$	fU
50-52	49.5 - 52.5	15	51	-2	-30
53-55	52.5 - 55.5	110	54	-1	-110
56-58	55.5 - 58.5	135	57	0	0
59-61	58.5 - 61.5	115	60	1	115
62-64	61.5 - 64.5	25	63	2	50
		400			25

Step deviation method

$$\text{Mean} = A + \left[\frac{\Sigma f u}{\Sigma f}\right] \times h$$

$$= 57 + \frac{\cancel{25}^{1}}{\cancel{400}_{16}} \times 3$$

$$= 57 + \frac{3}{16}$$

$$= 57 + 0.1875$$

$$\boxed{= 57.1875}$$

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

l = lower Limit of modal class

f_1 = frequancy of modal class

f_0 = frequany of the class preceeding the modal class

f_2 = frequancy of the class suceeding the modal class.

h = size of class interval

Ex-13.2

Q-1 Let $h = 10$

Age C.I.	No. of patient	C.M	$d = x-a$	$v = \frac{d}{h}$	fv
5-15	6	10	-20	-2	-12
15-25	11	20	-10	-1	-11
25-35	21	a=30	0	0	0
35-45	23	40	10	1	23
45-55	14	50	20	2	28
55-65	5	60	30	3	15
	$\Sigma f = 80$				43

$$\text{Mean} = a + \left[\frac{\Sigma fv}{\Sigma f}\right] \times h$$

$$= 30 + \left[\frac{43}{8\cancel{0}}\right] \times 1\cancel{0}$$

$$= 30 + 5.37$$

$$= 35.37 \text{ age}$$

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

$l = 35$
$h = 10$
$f_1 = 23$
$f_0 = 21$
$f_2 = 14$

35
46

$$= 35 + \left[\frac{23 - 21}{2 \times 23 - 21 - 14}\right] \times 10$$

$$= 35 + \left[\frac{20}{11}\right]$$

$$= 35 + 1.81$$

$$= 36.81$$

Maximum no. of pateient are admitted in hospital are of the age

36.81 year.
while the average age of patient admitted in the hospital is 35.37 years.

Q-2-

Lifetimes (in hours)	frequency
0 - 20	10
20 - 40	35
40 - 60	52
60 - 80	61
80 - 100	38
100 - 120	29

$l = 60$
$h = 20$
$f_1 = 61$
$f_0 = 52$
$f_2 = 38$

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

$$= 60 + \left[\frac{61-52}{2\times61-52-38}\right] \times 20$$

$$= 60 + \left[\frac{9}{32} \times 20\right]$$

$$= 60 + \frac{180}{32}$$

$$= 60 + 5.62$$
$$= 65.62$$

Q.6

No. of cars	Frequancy
0 - 10	7
10 - 20	14
20 - 30	13
30 - 40	12
40 - 50	20
50 - 60	11
60 - 70	15
70 - 80	8

$l = 40$
$h = 10$
$f_1 = 20$
$f_0 = 12$
$f_2 = 11$

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

$$= 40 + \left[\frac{20 - 12}{2 \times 20 - 12 - 11}\right] \times 10$$

$$= 40 + \frac{80}{17}$$

$$= 40 + 4.7$$

$$= \boxed{44.7}$$

Median :-

$$\boxed{\text{Media} = l + \left[\frac{\frac{n}{2} - cf}{f}\right] \times h}$$

$$\boxed{\text{Mode} = 3\,\text{Median} - 2\,\text{Mean}}$$

l = lower limit of median class
n = No. observation
cf = Cumulative frequency of class preceding the M.C.
f = Frequency of median class
h = class size

Q-1-

C.I	f	cf
65-85	4	4
85-105	5	9
105-125	13	22
125-145	20	42
145-165	14	56
165-185	8	64
185-205	4	68
	68	

for median
$\frac{n}{2} = 34$

$l = 125$
$h = 20$
$cf = 22$
$f = 20$

for mode
$f_1 = 20$
$l = 125$
$f_0 = 13$
$f_2 = 14$
$h = 20$

$$\text{Median} = l + \left[\frac{\frac{n}{2} - cf}{f}\right] \times h$$

$$= 125 + \left[\frac{34-22}{\cancel{20}}\right] \times \cancel{20}$$

$$= 125 + 12$$

$$\boxed{\text{Median} = 137}$$

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

$$= 125 + \left[\frac{20-13}{2\times20 - 13 - 14}\right] \times 20$$

$$= 125 + \left[\frac{7 \times 20}{13}\right]$$

$$= 125 + \frac{140}{13}$$

$$= 125 + 10.75$$

$$\boxed{\text{Mode} = 135.75}$$

mean = Mode + 2m

$$\text{mean} = \frac{3\,\text{Median} - \text{Mode}}{2}$$

$$= \frac{3 \times 137 - 135.75}{2}$$

$$= \frac{441 - 135.75}{2}$$

$$= \frac{275.25}{2}$$

$$\boxed{\text{mean} = 137.62}$$

Q.2-

Class interval	cf	f
0 - 10	5	5
10 - 20	$5+x$	x
20 - 30	$25+x$	20
30 - 40	$40+x$	15
40 - 50	$40+x+y$	y
50 - 60	$45+x+y$	5
$\cancel{60}$ -	$\cancel{60}$	60
Total		

median = 28.5

$l = 20$, $cf = 5+x$

$h = 10$

$\frac{n}{2} = 30$

$f = 20$

$\boxed{\begin{aligned} 45+x+y &= 60 \\ x+y &= 15 \quad \text{— (1)} \end{aligned}}$

$$\text{median} = l + \left[\frac{\frac{n}{2} - cf}{f}\right] \times h$$

$$28.5 = 20 + \left[\frac{30 - 5 - x}{2\cancel{0}}\right] \times 1\cancel{0}$$

$$8.5 = \frac{25 - x}{2}$$

$$17 = 25 - x$$

$$x = 25 - 17$$

$$\boxed{x = 8}$$

from (1)

$$x + y = 15$$

$$8 + y = 15$$

$$y = 15 - 8$$

$$\boxed{y = 7}$$

Q-3-

Age (in year)	Class Interval	cf	f
Below 20	18 - 20	2	2
" 25	20 - 25	6	4
" 30	25 - 30	24	18
" 35	30 - 35	45	21
" 40	35 - 40	78	33
" 45	40 - 45	89	11
" 50	45 - 50	92	3
" 55	50 - 55	98	6
" 60	55 - 60	100	2

$\frac{n}{5} = 50$

$l = 35$

$h = 5$

$cf = 45$

$f = 33$

$$\text{Median} = l + \left[\frac{\frac{n}{2} - cf}{f}\right] \times 5$$

$$= 35 + \left[\frac{50 - 45}{33}\right] \times 5$$

$$= 35 + \left[\frac{25}{33}\right]$$

$$= 35 + 0.76$$

$$\boxed{= 35.76 \text{ year}}$$

Q-4-

Class Interval	f	cf
117.5 - 126.5	3	3
126.5 - 135.5	5	8
135.5 - 144.5	9	17
144.5 - 153.5	12	29
153.5 - 162.5	5	34
162.5 - 171.5	4	38
171.5 - 180.5	2	40

$\frac{n}{2} = 20$

$cf = 17$
$l = 144.5$
$h = 9$
$f = 12$

$$\text{median} = l + \left[\frac{\frac{n}{2} - cf}{f}\right] \times h$$

$$= 144.5 + \left[\frac{20-17}{\cancel{12}\,4}\right] \times \cancel{9}\,3$$

$$= 144.5 + \frac{9}{4}$$

$$= 144.5 + 2.25$$
$$= 146.75 \text{ mm.}$$

Q-7-

class Interval	f	Cf
~~40 - 45~~	2	2
45 - 50	3	5
50 - 55	8	13
55 - 60	6	19
60 - 65	6	25
~~65 - 70~~	3	28
70 - 75	2	30

$\frac{n}{2} = 15$, $cf = 13$

$l = 55$, $h = 5$, $f = 6$

$$\text{median} = l + \left[\frac{\frac{n}{2} - cf}{f}\right] \times h$$

$$= 55 + \left[\frac{15-13}{6}\right] \times 5$$

$$= 55 + \frac{10}{6}$$

$$= 55 + 1.666$$

27/11/23

Chapter ⇒ 14
Probability

(i) Probability of an event = $\frac{\text{No. of favourable event}}{\text{Total no. of cases}}$

$$\boxed{P(E) = \frac{n(E)}{n(S)}}$$

(ii) $P(E) + P(\bar{E}) = 1$

(iii) $0 \le P(E) \le 1$

Sure / certain event = 1
Impossible event = 0

(iv) $P(E)_1 + P(E)_2 + P(E)_3 \ldots = 1$

Ex- 14.1

$P(E) = 0.05$
$P(\bar{E}) = ?$
w.k.T.

$$P(E) + P(\bar{E}) = 1$$
$$P(\bar{E}) = 1 - P(E)$$
$$P(\bar{E}) = 1 - 0.05$$
$$\boxed{P(\bar{E}) = 0.95}$$

$P(\bar{E}) = 0.992$
$P(E) = ?$
w.k.T

$$P(E) + P(\bar{E}) = 1$$
$$P(E) = 1 - P(\bar{E})$$
$$P(E) = 1 - 0.992$$
$$\boxed{P(E) = 0.008}$$

Red = 3 balls $\qquad n(S) = 8$
Black = 5 balls.

Prob. of getting a red ball $= \frac{n(E)}{n(S)} = \frac{3}{8}$

Prob. of getting a not red ball $= \frac{n(E)}{n(S)} = \frac{5}{8}$

100 — 50p
50 — ₹1
20 — ₹2
10 — ₹5

Page

(i) Prob. of that the coin of 50p $= \frac{n(E)}{n(S)} = \frac{10\cancel{0}}{18\cancel{0}} = \frac{5}{9}$

(ii) Prob. that the coin not ₹5 $= \frac{n(E)}{n(S)} = \frac{17\cancel{0}}{18\cancel{0}} = \frac{17}{18}$

Q-11 5 — Male Fish
8 — Female Fish

$n(S) = 13$

Prob. of getting a male fish $= \frac{P(E)}{P(S)} = \frac{5}{13}$

Q 12 $n(S) = 8$

(i) Prob. that it will point at 8 $= \frac{n(E)}{n(S)} = \frac{1}{8}$

(ii) Prob. that it will point at odd no. $= \frac{n(E)}{n(S)} = \frac{4}{8} = \frac{1}{2}$

(iii) Prob. that will point at no. of greater than 2 $= \frac{n(E)}{n(S)} = \frac{6}{8} = \frac{3}{4}$

(iv) Prob. that will point at no of less than 9 $= \frac{n(E)}{n(S)} = \frac{8}{8} = 1$

Q-13 $S = \{1, 2, 3, 4, 5, 6\}$

(i) Prime no. $= \{2, 3, 5\}$

prob. of getting a prime no. $= \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$

(ii) A: No. lying b/w 2 and 6 $= \{3, 4, 5\}$

prob. of getting a no. b/w 2 & 6 $= \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$

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

prob. of getting an odd no. $= \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$

Q-14 $n(S) = 52$, $n(E) = 2$

(i) prob. of getting a King of red colour $= \frac{n(E)}{n(S)} = \frac{2}{52} = \frac{1}{26}$

$n(S) = 52$, $n(E) = 12$

(ii) prob. of getting a face card $= \frac{n(E)}{n(S)} = \frac{12}{52} = \frac{3}{13}$

(iii) $n(S) = 52$, $n(E) = 6$

prob. of getting a red face card $= \frac{n(E)}{n(S)} = \frac{6}{52} = \frac{3}{26}$

(iv) $n(S) = 52$, $n(E) = 1$

prob. of getting a Jack of heart = $\frac{n(E)}{n(S)} = \frac{1}{52}$

(v) $n(E) = 13$, $n(S) = 52$

prob. of getting a spades card = $\frac{n(E)}{n(S)} = \frac{13}{52} = \frac{1}{4}$

(vi) $n(E) = 1$ $n(S) = 52$

prob. of getting a queen of Diamond = $\frac{n(E)}{n(S)} = \frac{1}{52}$.

Q-15 Ten, Jack, Queen, King, ace

(i) Prob. of getting Queen = $\frac{n(E)}{n(S)} = \frac{1}{5}$

Ten, Jack, King, ace

(ii)(a) Prob. of getting an ace = $\frac{n(E)}{n(S)} = \frac{1}{4}$

(b) Prob. of getting an Queen = $\frac{n(E)}{n(S)} = \frac{0}{4} = 0$

Q-16 132 good pen + 12 Defective pen = $n(S) = 144$

Prob. of getting a Good pen = $\frac{n(E)}{n(S)}$

$= \frac{132}{144} = \frac{11}{12}$

Q-18 $n(S) = 90$

(i) No. of two digit no. $= 81 = n(E)$

prob. of getting a two digit no. $= \frac{n(E)}{n(S)} = \frac{81}{90} = \frac{9}{10}$

(ii) perfect sq. no $= 1, 4, 9, 16, 25, 36, 49, 64, 81$

$n(E) = 9$

prob. of getting a perfect sq. no. $= \frac{n(E)}{n(S)} = \frac{9}{90} = \frac{1}{10}$

(iii) No. divisible by $= n(E) = 18$

prob. of getting a no. which is divisible by $5 = \frac{n(E)}{n(S)}$

$= \frac{18}{90} = \frac{1}{5}$

Q-19 A B C D E A

$n(S) = 6$ $n(E) = 2$

(i) prob. of getting A $= \frac{n(E)}{n(S)} = \frac{2}{6} = \frac{1}{3}$

(ii) $n(E) = 1$, $n(S) = 6$

prob. of getting D $= \frac{n(E)}{n(S)} = \frac{1}{6}$

Q-22 (1,1) (1,2) (1,3) (1,4) (1,5) (1,6)

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

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

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

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

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

event sum on 2 die	2	3	4	5	6	7	8	9	10	11	12
probability	$\frac{1}{36}$	$\frac{2}{36}$	$\frac{3}{36}$	$\frac{4}{36}$	$\frac{5}{36}$	$\frac{6}{36}$	$\frac{3}{36}$	$\frac{4}{36}$	$\frac{3}{36}$	$\frac{2}{36}$	$\frac{1}{36}$

Q-23 S = {HHH, HHT, HTH, THH, TTT, TTH, THT, HTT}

(i) Prob. of Hanif will lose the game = $\frac{n(E)}{n(S)} = \frac{6}{8} = \frac{3}{4}$

Q-25- S = {HH, TH, HT, TT}
(i)

~~even~~ Incorrect event are not equaly likely.

(ii) S = {1, 2, 3, 4, 5, 6}
odd no. = {1, 3, 5}
n(E) = 3

prob. of getting an odd no. $= \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$

event are equaly likely.

09/11/23