Answer Key

Q.1 $2x^2 - 7x - 15 = 0$

$2x^2 – 10x + 3x - 15 = 0$

$2x (x-5) + 3 (x – 5) = 0$

$(x – 5) (2x + 3) = 0$

$x – 5 = 0$

$x = 5$

$2x + 3 = 0$

$2x = - 3$

$X = \frac{-3}{2}$

Or

$2x^2 + Px + 8 = 0$

$a = 2, b = P, c = 8$

it is given read & equal roots

$b^2 – 4ac = 0$

$p^2 – 4×2×8 = 0$

$p = √64$

$p = 8,-8$

Q.2 Diameter = 14c

r = 7 cm

Total height = 13 cm

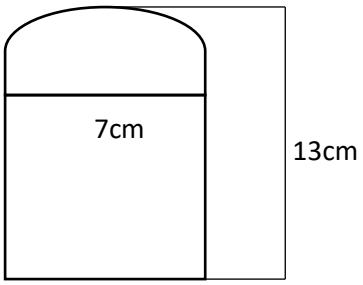
Height of cylinder = 13 -7 = 6cm

Total surface area = $2\pi r2 + 2\pi rh$

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

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

$= 44 \times 13 = 572 \text{ cm}^2$



Q.3

Marks	No. of students
30-35	14
35-40	16
40-45	18
45-50	23 ----------f1
50-55	18
55-60	8
60-65	3

Mode $= L + (\frac{f1-f0}{2f1-f0-f2}) \times h$

$= 45 + \frac{23-18}{46-18-18} \times 5$

$= 45 + \frac{5}{\cancel{10}_2} \times \cancel{5}$

$= 45 + 2.5 = 47.5$

Q.4 -10, -5, 0, 5, ----------

$a = 10, d = -5 - (-10) = 5$

$T_{15} = a + 14d$

$= -10 + 14 \times 5 = -10 + 70 = 60$

Q.5

Marks	No. of Students	X_1	$F_1 \times X_1$
0-10	15	5	75
10-20	20	15	300
20-30	35	25	875
30-40	P	35	35P
40-50	10	45	450
50-60	42	55	2310
	122 +P		4010 +35P

Mean $= \sum \frac{fixi}{fi}$

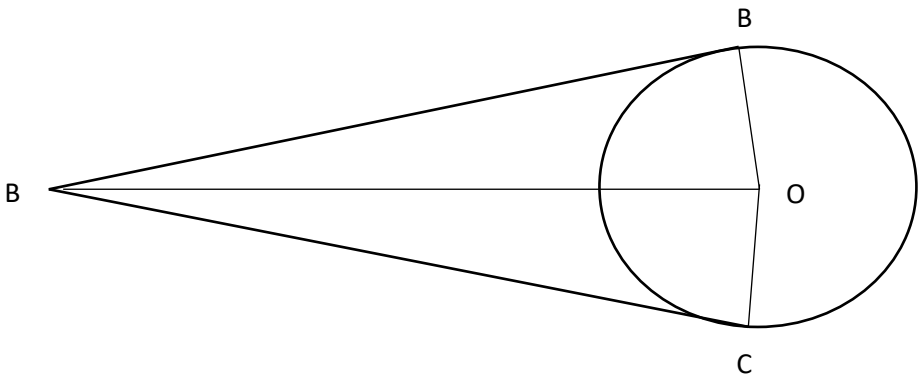
$$\frac{34}{1} = \frac{4010+35P}{122+P}$$

$4010 + 35P = 4148 + 34P$

$35P - 34P = 4148 - 4010$

$P = 138$

Q.6



ΔAOB & ΔAOC

AO = AO (common side)

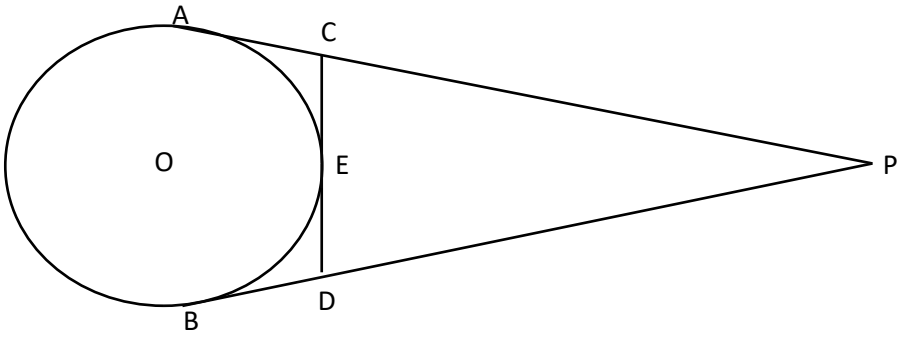
OB = OB (radii)

$\angle B = \angle C = 90^0$ (angle between radius and tangents)

$\Delta AOB \cong \Delta AOC$ (R.H.S)

$AB = AC$ (C.P.C.T.)

OR



PA = 14cm

PA = PB = 14 cm (Length of tangents from external points)

Perimeter ΔPCD = PC + CD +PD

= PC + CE + ED + PD

= PC + CA + DB + PD [$\because CE = CA, DE = BD$]

= PA + PB

= 14 + 14

= 28 cm

Q.7 7, 11, 15 _ _ _ _ _ _ _ 139

Tn = a + (n – 1)d

139 = 7 + (n – 1)4

132 = (n-1)4

n – 1 = 33

n = 34

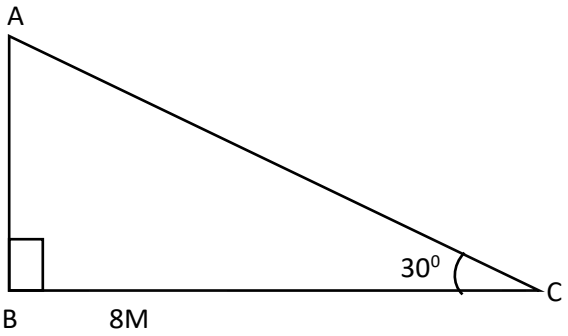
$S_n = \frac{n}{2}$ [2a + (n – 1)d]

$S_{20} = \frac{20}{2}$ [2×7 + (20 – 1)4]

= 10[14 + 76]

= 10 × 90 = 900

Q.8



$\frac{AB}{8}$ = tan 30 $\frac{AC}{8}$ = Sec 30 = $\frac{2}{\sqrt{3}}$

$\frac{AB}{8} = \frac{1}{\sqrt{3}}$ AC = $\frac{16}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{16\sqrt{3}}{\sqrt{3}}$

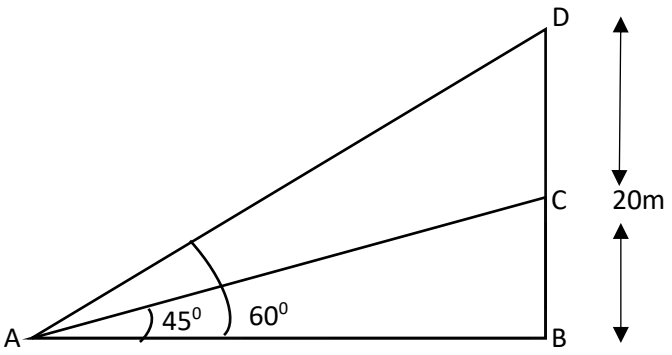
AB = $\frac{8}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{8\sqrt{3}}{3}$

Total length of tree = $\frac{8\sqrt{3}}{3} + \frac{16\sqrt{3}}{\sqrt{3}}$

= $\frac{8\sqrt{3}+16\sqrt{3}}{3}$ = $\frac{8}{24\sqrt{3}}{3}$

= 8√3 m

Or



In Rt. Δ ABC

$\frac{AB}{BC}$ = Cot 45^0

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

AB = 20

In Rt. Δ ABC

$\frac{BD}{AB}$ = Tan 60^0

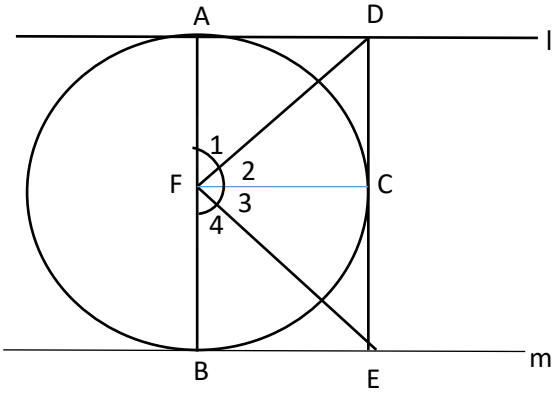
$\frac{20+h}{20}$ = √3

20 + h = 20√3

h = 20√3 -20^0

= 20 (√3 -1)m

Q.9



To Prove $\angle DEF = 90^0$

Cons. -: Join FC

Proof Δ ADF & Δ CDF

DF = DF (Common side)

AD = DC (Length of Tangents)

AF = CF (Radii)

ΔADF ≅ Δ CDF (SSS)

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

EQULLY $\angle 3 = \angle 4$ (CPCT)

$\angle 1 + \angle 2 + \angle 3 + \angle 4 = 180$ (Angles on straight line)

$2\angle 2 + 2\angle 3 = 180$

$\angle 2 + \angle 3 = \frac{\cancel{180}}{\cancel{2}} 90$

$\angle DFE = 90^0$

Q.10 Let the consecutive the no. = x, x+1, x+2,

ATQ

$(x)^2 + (x+1)^2 + (x+2)^2 = 50$

$x^2 + x^2 + 1 + 2x + x^2 + 4 + 4x = 50$

$3x^2 + 6x + 5 - 50 = 0$

$3x^2 + 6x - 45 = 0$

Or

$x^2 + 2x - 15 = 0$

$x^2 + 5x - 3x - 15 = 0$

$x(x+5) - 3(x+5) = 0$

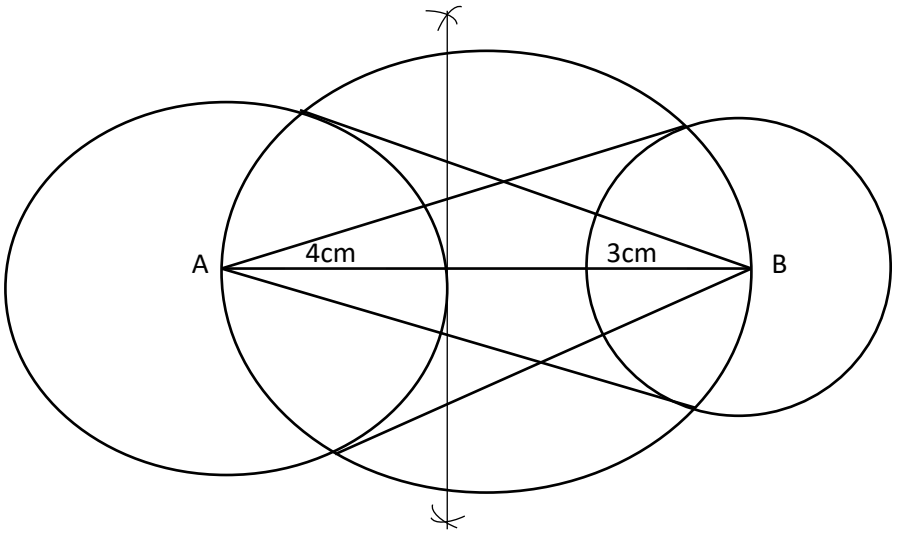
$(x + 5)(x - 3) = 0$

$x + 5 = 0 \quad | \quad x = 3$

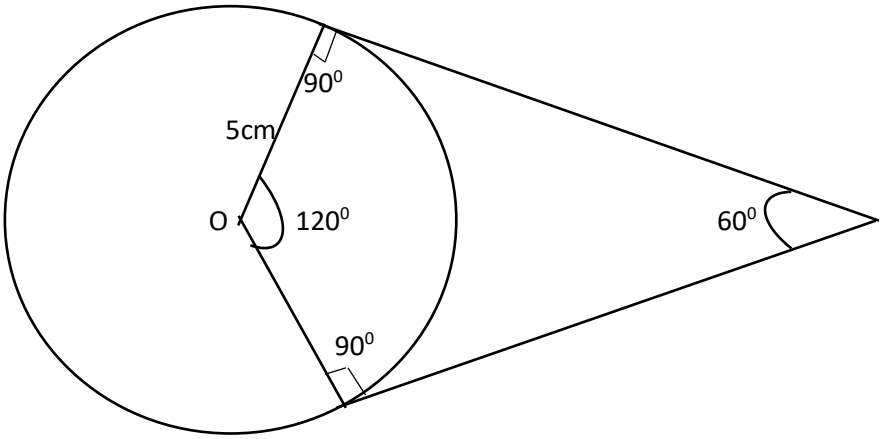
$x = -5$

so, the three numbers are 3, 4, 5

Q.11



Or



Q.12

Marks	No. of students	C.I.	Fi	Cf
Below 10	15	0-10	15	15
Below 20	45	10-20	30	45
Below 30	90	20-30	45	90
Below 40	102	30-40	12	102
Below 50	120	40-50	18	120
			120	

$x = 120, \frac{n}{2} = 60, l = 20, fi = 45, cf = 45$

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

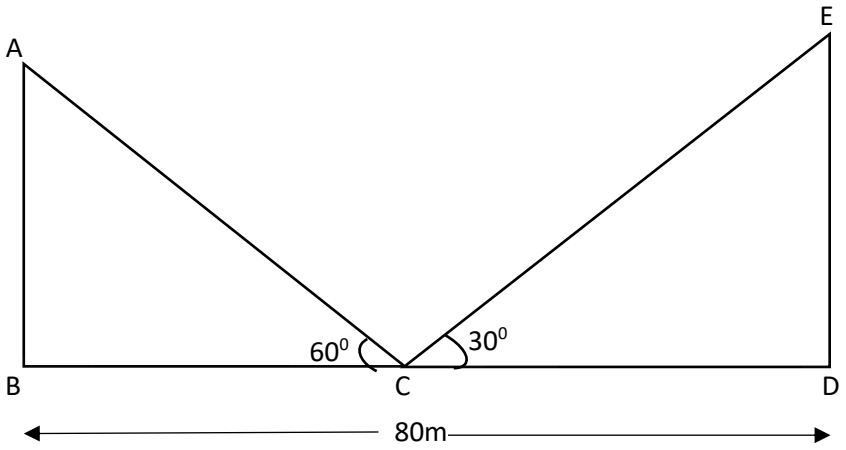
$$= 20 + \frac{60-45}{45} \times 10$$

$$= 20 + \frac{\cancel{15}}{\cancel{45}_{3}} \times 10$$

$$= 20 + \frac{10}{3}$$

$$= 20 + 3.33 = 23.33$$

Q.13



i. Distance between two poles = 80m

Let BC = x

So, CD = 80-x

Let the height of both poles = h

In Rt. Δ ABC

$$\frac{AB}{BC} = \tan 60^0$$

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

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

In ΔCDE

$$\frac{DE}{CD} = \tan 30^0$$

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

$$\frac{\sqrt{3}x}{80-x} \times \frac{1}{\sqrt{3}}$$

$3x = 80\text{-}x$

$4x = 80$

$x = 20$

so the height of pole $= \sqrt{3} \times 20$

$= 20\sqrt{3}$

ii. BC = 20

CD = 80-20 = 60

So Mohan is 20 m far from 1st pole and 60m far from 2nd pole.

Q.14 Diameter of well = 4m

So radius = 2m

i. Depth of well = 21m

So volume of soil taken out = $\pi r^2 h$

$$= \frac{22}{\cancel{7}} \times 2 \times 2 \times \cancel{21}^{3}$$

$$= 264 m^3$$

Embankment is also in the shape of hollow cylinder

So, external radius of embankment = 2+3 = 5m

Internal radius of embankment = 2m

ATQ

Volume of soil taken out from well = volume of embankment

$$264 = \pi (R^2 - r^2) h$$

$$264 = \frac{22}{7} \times (5^2 - 2^2) \times h$$

$$264 = \frac{22}{\cancel{7}} \times \cancel{21}^{3} \times h$$

$$h = \frac{\cancel{264}^{4}}{\cancel{66}}$$

so the height of embankment = 4m

ii. Volume of the soil taken out = volume of platform

$$\pi r^2 h = L \times B \times H$$

$$\frac{22}{7} \times 2 \times 2 \times 21 = 8 \times 7 \times h$$

$$= \frac{\cancel{22}^{11}}{\cancel{7}} \times \frac{\cancel{2 \times 2 \times 21}^{3}}{\underset{2}{\cancel{8 \times 7}}} = h$$

$$h = \frac{33}{7}$$

So height of platform = 4.71m