KEY

CHAPTER - 8

Similar Triangles

Similar Practice Questions :

Exercise – 8.1 and 8.2

1) 1.5 cm 2) 5 cm 3) 1 : 9

6) 15 cm 7) 1.8 cm

Exercise –8.3

2) 21 cm^2 3) 1 : 4 cm 8) 6 cm

Exercise –8.4

1) i) No ii) No iii) Yes iv) Yes

2) 25 m 4) 104 m 5) 10 m 10) Yes

Creative zone :

I. 1. Given PO = 15 cm, QO = 10cm and RQ = 8 cm
PS = ?

From similar triangles,

$$\frac{PS}{RQ} = \frac{PO}{QO}$$

$$\Rightarrow \frac{PS}{8} = \frac{15}{10}$$

$$\Rightarrow PS = \frac{15}{10} \times 8$$

$$= \frac{120}{10} = 12$$

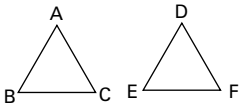
$\therefore$ PS = 12 cm.

2. Let ABC and DEF be two similar triangles of perimeters 40 cm and 30 cm.

The ratio of perimeters = 40 : 30 = 4 : 3

Let AB = 16 cm

Since $\Delta ABC \sim \Delta DEF$



We have $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

[$\therefore$ The ratio of corresponding sides of similar sides is equal to the ratio of their perimeters]

$$\therefore \frac{AB}{DE} = \frac{4}{3}$$

$$\Rightarrow \frac{16}{DE} = \frac{4}{3}$$

$$\Rightarrow 4 \times DE = 16 \times 3$$

$$\Rightarrow DE = \frac{16 \quad 3}{4}$$

$$= 4 \times 3$$

$$\Rightarrow DE = 12$$

Hence, the corresponding side of the triangle = 12 cm.

3. Given areas of two similar triangles are 64cm^2 and 49 cm^2

Altitude of the bigger triangle = 3.2 cm.

Let the corresponding altitude of the smaller triangle be 'x'.

We know that in similar triangles.

$$\frac{\text{Area of bigger triangle}}{\text{Area of smaller triangle}} = \left(\frac{\text{Altitude of bigger triangle}}{\text{Altitude of smaller triangle}}\right)^2$$

$$\Rightarrow \frac{64}{49} = \left(\frac{3.2}{x}\right)^2$$

$$\Rightarrow \frac{64}{49} = \frac{3.2 \times 3.2}{x^2}$$

$$\Rightarrow x^2 = \frac{3.2 \times 3.2 \times 49}{64}$$

$$x = \sqrt{\frac{3.2 \times 3.2 \times 49}{64}}$$

$$= \sqrt{\frac{(3.2)^2 \times 7^2}{8^2}}$$

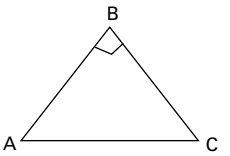
$$x = \sqrt{\left(\frac{3.2 \times 7}{8}\right)^2}$$

$$x = \frac{3.2 \times 7}{8}$$

$$x = 2.8 \text{ cm.}$$

$\therefore$ Length of the corresponding altitude of smaller trianlge = 2.8 cm.

4.



In ΔABC, $\angle ABC = 90°$

$\therefore$ AC is the hypotenuse,

Since it is an isosceles triangle, AB = BC

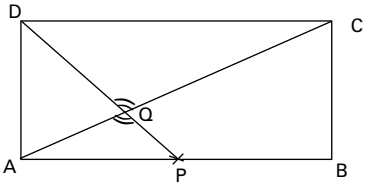
By pythagoras theorem.

$AC^2 = AB^2 + BC^2$

$= BC^2 + BC^2$ ($\because$ AB = BC)

$\therefore AC^2 = 2BC^2$

5.



Given ▭ ABCD is a parallelogram

P is a point on AB

DP and AC intersect at Q.

R.T.P : $\frac{CQ}{OA} = \frac{QD}{QP}$

Proof : In ΔCQD, ΔAQP

$\angle QCD = \angle QAP$, $\angle CQD = \angle AQP$

$\therefore \angle QDC = \angle QPA$

Thus $\Delta CQD \sim \Delta AQP$ by A.A.A similarity condition

Now $\frac{CQ}{AQ} = \frac{QD}{QP} = \frac{CD}{AP}$

(By ratio of correspondings sides of similar triangles)

$\therefore \frac{CQ}{QA} = \frac{QD}{QP}$

II. 1) B 2) D 3) A 4) C 5) D

6) C 7) C 8) B 9) B 10) C

11) D 12) A 13) C 14) B 15) C

CHAPTER - 9

Tangents and Secants to a Circle

Similar Practice Questions :

1) r = 4.5 cm 4) 38.5 cm^2

5) 66 cm^2 6) R = 10 cm, r = 4 cm

7) 192.5 cm^2

8) Area of minor segment = 56 cm^2

Area of the major segment = 560 cm^2

10) AD = 7 cm, BE = 5 cm, CF = 3cm

13) R = 13 cm 15) r = 2 cm

Creative zone :

I. 1. Given length of chord = AB = 40 cm

$PB = \frac{AB}{2} = \frac{40}{2} = 20$ cm

Radius of smaller circle = 15 cm = OP

Let OB = Radius of the larger circle.

From the figure $\angle OPB = 90^\circ$

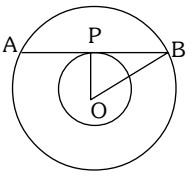
By pythagoras theorm,

$OB^2 = OP^2 + PB^2$

$= 15^2 + 20^2$

$= 225 + 400$

$OB^2 = 625$



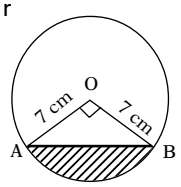
$\therefore OB = \sqrt{625} = 25$ cm

$\therefore$ Radius of the larger circle = OB = 25 cm

2. Given angle subtended by the chord = $90^\circ = x$

Radius of the circle = 7 cm = r

Area of the minor segment = Area of the sector OAB – Area of ΔOAB



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

$= \frac{x^\circ}{360^\circ} \times \frac{22}{7} \times 7 \times 7$

$= 38.5$ cm^2

Area of the triangle OAB $= \frac{1}{2} \times$ Base $\times$ Height

$= \frac{1}{2} \times 7 \times 7 = 24.5$ cm^2

$\therefore$ Area of the minor segment = 38.5 – 24.5 cm^2

= 14 cm^2

Area of the major segment = Area of the circle – Area of the Minor segment

$= \pi r^2 - 14$

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

$= 154 - 12 = 140$ cm^2

3. Given ABCD is square of side = 10 cm

Radius of semi circle $= \frac{10}{2} = 5$ cm = r

Area of the shaded region = Area of square ABCD – Area of 2 semi circles

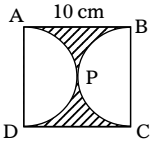
$= 10 \times 10 - 2 \times \left(\frac{1}{2}\pi r^2\right)$

$= 100 - \pi r^2$

$= 100 - \frac{22}{7} \times 5 \times 5$

$= 100 - 78.57$

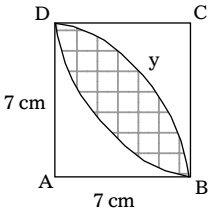
$= 21.43$ cm^2



$\therefore$ Area of the shaded region = 21.43 cm^2

4. Given Radius of the circle = 7 cm = r

Area of the designed region



= 2(Area of quadrant ABPD

– Area of ΔABD)

$= 2\left[\frac{1}{4}\pi r^2 - \frac{1}{2}\times \text{base}\times\text{height}\right]$

$= 2\left[\frac{1}{4}\times\frac{22}{7}\times 7\times 7 - \frac{1}{2}\times 7\times 7\right]$

= 2[38.5 – 24.5]

= 2[14]

= 28 cm^2

∴ Area of the designed region = 28 cm^2

II. 1) B 2) A 3) A 4) C 5) C
6) B 7) D 8) A 9) D 10) B
11) C 12) D 13) A

CHAPTER - 10

Mensuration

Similar Practice Questions :

Exercise – 10.1

1) 1.214.5 cm^2

2. greatest diameter = 7 cm

surface area = 332.5 cm^2

3. radius = 6 cm 4. Height = 2.74 cm

5. apparent capacity = 196.25 cm^3

actual capacity = 163.54 cm^3

6. 693 cm^3 7. 36 cm, $12\sqrt{3}$ cm 8. $\frac{8}{3}$ cm

9. 448 meters 10. 2.5 cm 11. 6.4 cm

12. 1500 13. 2.744 cm 14. 9735 m^2

15. 374 cm^2 16. Rs. 22000/- 17. Rs. 457.60

18. i) 77 cm^3 ii) 748 cm^3 19. 1388.7 kg

Creative zone :

I. 1. Given radius of sphere = 5.4 cm = R

and radius of cylinder = 9 cm = r

Let the height of cylinder = h

Since sphere is melted into the shape of cylinder.

∴ volume of the sphere = volume of the cylinder

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

$\Rightarrow \frac{4}{3}\times\frac{22}{7}\times (5.4)^3 = \frac{22}{7}\times 9^2\times h$

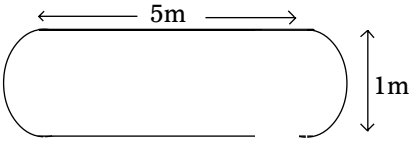
$\Rightarrow h = \frac{4}{3}\times\frac{(5.4)^3}{9^2}$

$= \frac{4}{3}\times\frac{5.4\times 5.4\times 5.4}{9\times 9}$

h = 2.592 = 2.6 cm

Hence, the height of the cylinder = h = 2.6 cm

2.



Surface area of oil drum = C.S.A of 2 hemispheres + C.S.A of the cylinder.

Hemisphere : Radius = r = $\frac{d}{2} = \frac{1}{2}$ = 0.5 m

C.S.A of two hemispheres

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

$= 2\times 2\times \frac{22}{7}\times (0.5)^2$

= 3.14 m^2

Cylinder : Radius = r= $\frac{d}{2} = \frac{1}{2}$ = 0.5 m

Height = h = 5m

C.S.A of cylinder = 2πrh

$= 2\times\frac{22}{7}\times 0.5\times 5$

= 15.71 m^2

∴ Surface area of the oil drum = 3.14 + 15.71

= 18.85 m^2

3. The base of the largest right circular cylinder will be the circle in scribed in a face of the cube and its height will be equal to an edge of the cube.

r = Radius of the base of the cylinder

$= \frac{14}{2} = 7$ cm

h = Height of the cylinder = 7 cm

Hence, volume of the cylinder

$= \pi r^2 h$

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

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

$= 1078$ cm^3

4. Diameter of well = d = 3.5 m

$\therefore$ Radius of well = r = $\frac{d}{2} = \frac{3.5}{2}$

Depth of the well = 10 m = h

Quantities of the earth digout = Volume of the cylindrical well = $\pi r^2 h$

$= \frac{22}{7} \times \left(\frac{3.5}{2}\right)^2 \times 10$

$= \frac{22}{7} \times \frac{3.5}{2} \times \frac{3.5}{2} \times 10$

$= 96.25$

Area of the platform on which the earth is spread out = $20 \times 12 = 240$ m^2

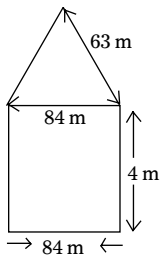
Let the height of the platform be = x cm

$240 \times x = 96.25$

$x = \frac{96.25}{240} = 0.40$ m

Hence the height the plat form = 0.40

5.



Given Height of cylindrical tent = h = 4m

Diameter of base = 84m = d

$\therefore$ Radius of base = $\frac{d}{2} = \frac{84}{2}$ = 42m = r

Slant height of conical part = 63 m = *l*

Rate per m^2 of canvas = ₹ 200

Surface area of cylindrical part = $2\pi rh$

$= 2 \times \frac{22}{7} \times 42 \times 4$

$= 1056$ m^2

Surface area of conical part = πrl

$= \frac{22}{7} \times 42 \times 63$

$= 8316$ m^2

Total canvas used = surface area of cylindrical part + surface area of conical part

$= 1056 + 8316 = 9372$ m^2

Hence the cost of canvas of the tent = total canvas used × Rate per m^2

$= 9372 \times 2$

= ₹ 18,744

6.Sol. Given diameter of sphere = 14 cm = d

$\therefore$ Radius = R = $\frac{d}{2} = \frac{14}{2} = 7$ cm

and Radius of base of cone = $2\frac{1}{3}$ cm

$= \frac{7}{3}$ cm = r

height of the cone = 2 cm = h

Now volume of sphere = $\frac{4}{3}\pi R^3$

$= \frac{4}{3} \times \frac{22}{7} \times 7^3$

volume of cone = $\frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times \left(\frac{7}{3}\right)^2 \times 2$

Number of cones formed = $\frac{\text{volume of sphere}}{\text{volume of cones}}$

Number of cones formed = $\frac{\frac{4}{\cancel{3}} \times \frac{22}{\cancel{7}} \times 7^3}{\frac{1}{\cancel{3}} \times \frac{22}{\cancel{7}} \times \left(\frac{7}{3}\right)^2 \times 2}$

$$= \frac{4\times7^3\times3^2}{7^2\times2}$$

$$= \frac{4\times7\times9}{2} = 2\times7\times9$$

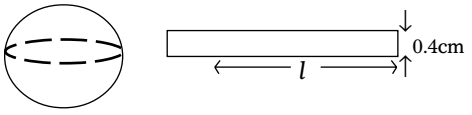
$$= 126$$

7. Given Radius of sphere = R = 3 cm

Diameter of cross section of wire = d = 0.4 cm

$\therefore$ Its radius = r = $\frac{d}{2} = \frac{0.4}{2}$ = 0.2 cm

cut h = length of the wire = *l*



Since the metallic sphere is converted into cylindrical shaped wire of length = *l* = h cm

$\therefore$ volume of metal sphere = volume of metal wire

$\frac{4}{3}\pi R^3 = \pi r^2 h$

$\Rightarrow \frac{4}{3}\times\frac{22}{7}\times(3)^3 = \frac{22}{7}\times(0.2)^2\times h$

$\Rightarrow \frac{4}{3}\times\frac{3^3}{(0.2)^2} = h$

$\Rightarrow h = \frac{4\times27}{3\times0.2\times0.2} = \frac{108}{0.12}$

$= 900$

$\therefore$ length of wire = h = 900 cm (.. 100 cm = 1 m)

$= 9$ m

8. Given length of road rolls = 2m = h = 200 cm

Its internal diameter = 40 cm

Thickness of iron sheet = 10 cm

$\therefore$ Internal Radius = $\frac{40}{2}$ = 20 cm = r

Now External Radius = Internal Radius + Thickness of iron sheet

= 20 + 10 = 30 cm = R

1 cm^3 of iron has 7.8 gm mass.

Now volume of the hollow cylindrical road roller

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

$= \pi(30^2 - 20^2)\times200$

$= \frac{22}{7}(900-400)\times200$

$= \frac{22}{7}\times500\times200$

$= 314285.71\ cm^3$

Mass of the roller = volume of the roller × gm mass/ 1 cm^3

$= 314285.71\times7.8$

$= 2451428.54$ gm

$= 2451.43$ kg. (.. 1000g = 1 kg)

II. 1) B 2) B 3) A 4) A 5) C
6) A 7) A 8) C 9) D 10) D
11) D 12) B 13) B 14) D 15) B
16) D

CHAPTER – 11

Trigonometry

Similar Practice Questions **:**

Exercise – 11.1

1) sin A = $\frac{12}{13}$; cos A = $\frac{5}{13}$; tan A = $\frac{12}{15}$

2) cos θ = $\frac{9}{41}$; tan θ = $\frac{40}{9}$

3) sin A = $\frac{9}{12}$; tan A = $\frac{9}{12}$

4) sin A = $\frac{6}{13}$; cos A = $\frac{12}{13}$

5) sin A = $\frac{15}{17}$; sec A = $\frac{17}{8}$

7) $\frac{b+a}{b-a}$ 8) $\sqrt{\frac{b+a}{b-a}}$ 9) Yes

Exercise –11.2

1. i) 1 ii) 9/2 iii) 1/4
   iv) 3 v) 5 vi) 9

2. $\frac{1}{2}$ 3) Yes 4) No

5. sin θ = $\frac{2}{\sqrt{5}}$; tan θ = 2 6) 1

Exercise –11.3

1. i) 1 ii) 1
   iii) 1 iv) 1 v) 1
2. i) 0 ii) 0 iii) 1
   iv) 1
3) A = 22°
4) cos 23° + sin 15°
5) cosec 14° + sec 38°
6) cot 25°+tan41°

Creative zone :

Exercise –11.1

I. Answer the following questions.

1. If cotθ = $\frac{a}{b}$, find the value of $\frac{1-\tan\theta}{1+\tan\theta}$.

Sol. Given $\cot\theta = \frac{a}{b} \Rightarrow \tan\theta = \frac{1}{\cot\theta} = \frac{1}{\frac{a}{b}} = \frac{b}{a}$

Now $\frac{1-\tan\theta}{1+\tan\theta} = \frac{1-\frac{b}{a}}{1+\frac{b}{a}} = \frac{\frac{a-b}{a}}{\frac{a+b}{a}} = \frac{a-b}{a+b}$

$$\frac{1-\tan\theta}{1+\tan\theta} = \frac{a-b}{a+b}$$

Exercise –11.2

2. In a right angled triangle ABC, right angled at B, ∠ACB = θ, AB = 12 cm, BC = 5 cm. Find the value of cos θ and tan θ.

Sol. Given ∠ACB = θ.

AB = 12 cm, BC = 5 cm

By Phythagoras theorem,

$AC^2 = AB^2 + BC^2$

$= 12^2 + 5^2$

AC2 = 144 + 25 = 169

AC = $\sqrt{169}$ = 13 cm

$\cos\theta = \frac{BC}{AC} = \frac{5}{13}$,

$\tan\theta = \frac{AB}{BC} = \frac{12}{5}$

Exercise –11.3

3. Express sin 75º + cos 67º interms of angles between 0 and 45º.

Sol. Given sin 75º + cos 67º

= sin(90 – 15º) + cos(90º – 23º)

= cos 15º + sin 23º.

[∵ sin(90 – θ) = cos θ; and cos(90 – θ) = sin θ]

Exercise –11.4

4. Show that $\frac{1+\cos\theta}{\sin\theta} + \frac{\sin\theta}{1+\cos\theta}$ = 2 cosec θ.

Sol. LHS = $\frac{1+\cos\theta}{\sin\theta} + \frac{\sin\theta}{1+\cos\theta}$

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

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

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

(∵ $\cos^2\theta + \sin^2\theta = 1$)

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

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

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

$= \frac{2}{\sin\theta}$

= 2 cosec θ = RHS

∴ LHS = RHS

5. If cos θ = $\frac{a}{b}$, find cosec θ + cot θ in terms of a and b.

Sol. Given $\cos\theta = \frac{a}{b} = \frac{BC}{AC}$

$\Rightarrow$ BC = a

AC = b

By Pythagoras theorem,

$AC^2 = AB^2 + BC^2$

$b^2 = AB^2 + a^2$

$\Rightarrow AB^2 = b^2 - a^2$ ∴ AB = $\sqrt{b^2-a^2}$

Now cosec $\theta = \frac{1}{\sin\theta} = \frac{AC}{AB} = \frac{b}{\sqrt{b^2-a^2}}$

$\cot\theta = \frac{BC}{AB} = \frac{a}{\sqrt{b^2-a^2}}$

Then cosec θ + cot $\theta = \frac{b}{\sqrt{b^2-a^2}} + \frac{a}{\sqrt{b^2-a^2}}$

cosec θ + cot $\theta = \frac{b+a}{\sqrt{b^2-a^2}}$ ($\because a = \sqrt{a}.\sqrt{a}$)

$= \frac{\sqrt{b+a}.\sqrt{b+a}}{\sqrt{b+a}.\sqrt{b-a}} = \frac{\sqrt{b+a}}{\sqrt{b-a}}$

$= \sqrt{\frac{b+a}{b-a}}$

II. Objective questions.

II. 1) A 2) C 3) D 4) A 5) B
6) A 7) D 8) B 9) C 10) D
11) A 12) C 13) D 14) C 15) A
16) D 17) B 18) A 19) D 20) C
21) B 22) D

CHAPTER – 12

Applications of Trigonometry

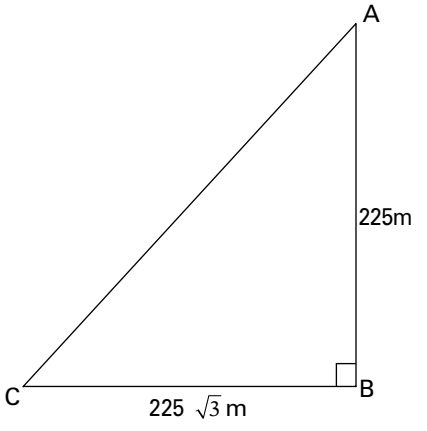
Similar Practice Questions :

Exercise – 12.1 and 12.2

1. $100\left(\sqrt{3}+1\right)$
3. $10\left(\sqrt{3}+1\right)$
4. 5.196 mts
5. 30°
6. $200\sqrt{3}$
7. $\frac{400}{\sqrt{3}}$
8. 236.5 m
9. $20\sqrt{3}$ mts
10. 129.9 mts
11. $8\sqrt{3}$ mts (or) 13.856 mts
12. 40 mts

Creative zone :

I. 1.



In Δ ABC $\angle$B = 90°

Let AB represents the height of the pole

AB = 225 m, and BC represents shadow at 8 O' clock BC = $225\sqrt{3}$

From Δ ABC, Tan $\theta = \frac{AB}{BC}$

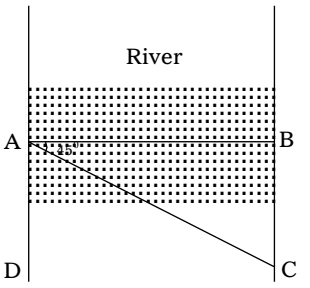
$$\text{Tan}\ \theta = \frac{225}{225\sqrt{3}}$$

$$\text{Tan}\ \theta = \frac{1}{\sqrt{3}}$$

$$\text{Tan}\ \theta = \text{Tan}\ 30° ;\ \theta = 30°$$

$\therefore$ The angle of elevation of the sunrays is 30°

2.



AB - width of river

AD, BC are river banks

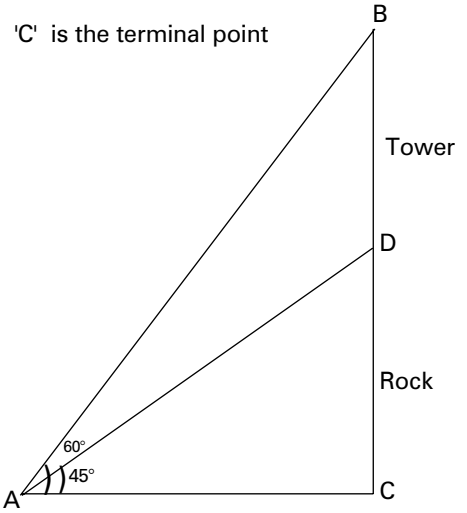
AC - The distance travelled in river

=500 m

'A' is initial point,

'C' is the terminal point

3.



Let CD = Rock ; BD = Tower

AC is distance of the foot of the rock

From the point of observation.

$$\tan 45° = \frac{CD}{AC}$$

$$\frac{CD}{AC} = 1$$

$$CD = 200$$

$\therefore$ Height of Rock CD = 200 m

From Δ ACD

$$\text{Tan } 60 = \frac{BC}{AC}$$

$$\sqrt{3} = \frac{200+BD}{200}$$

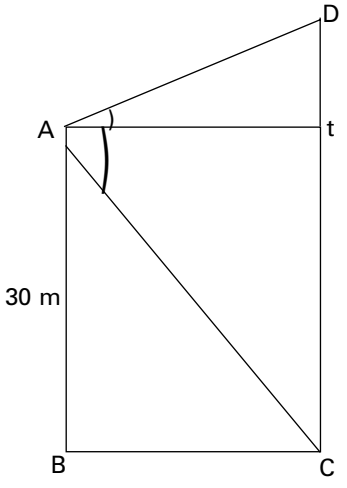
$$200 + BD = 200\sqrt{3}$$

$$BD = 200\sqrt{3} - 200$$

$$BD = 200(\sqrt{3}-1)$$

Height of the Tower is $200(\sqrt{3}-1)$m

4.

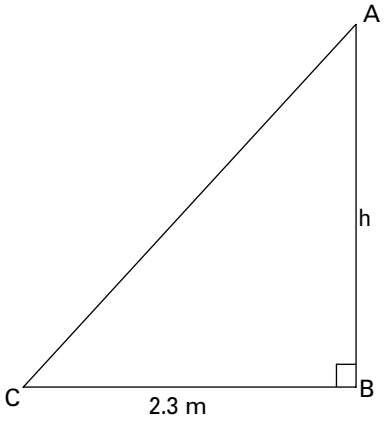


AB = height = 30 m

AD = Angle of elevation = 30°

AC = Angle of depression = 60°

5.



Let AC = Ladder laid = 4.6 m

BC = Distance between foot of wall and ladder = 2.3 m

From Δ ABC $\angle B = 90°$ So

$$AC^2 = AB^2 + BC^2$$

$$AB^2 = AC^2 - BC^2$$

$$h^2 = (4.6)^2 - (2.3)^2$$

$$h^2 = 21.16 - 5.29$$

$$h = \sqrt{15.87} \text{ m}$$

II. 1) D 2) B 3) B 4) D 5) C
6) B 7) B 8) B 9) C 10) A
11) C 12) B 13) B 14) A 15) A
16) C

CHAPTER – 13

Probability

Creative zone :

I. Answer the following questions.

1 Sol. Length of the rectangular region = 4m

Breadth of the rectangualr region = 3m

Area of the rectangular = $4 \times 3 = 12m^2$

Diameter of the circle = 2m

Radius of the circle = 2/2 = 1m

Area of the circle = πr^2

$$= \frac{22}{7} \times 1 \times 1$$

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

Probability that the dice will land inside the circle $= \frac{\frac{22}{7}}{12}$

$$= \frac{22}{84} = 0.26$$

2. Sol. (i) The figure shows the numbers from 1 to 10

Let E be the event that the arrow comes to rest pointing at 9.

Number of outcomes favourable to E = 1

Number of all possible outcomes = 10

$$= \frac{\text{No.of outcomes favourable to E}}{\text{No. of all possible outcomes}}$$

$$= \frac{1}{10}$$

(ii) The even number shown in the figure are 2, 4, 6, 8, 10

Let E be the event that the arrow will point an even number E = 5

number of all possible outcomes = 10

$\therefore$ P(E) = Number of outcomes favourable to E

Number of all possible outcomes

$$= \frac{5}{10} = \frac{1}{2}$$

(iii) The number which are the greater than 4 as per the figure given are, 5, 6, 7, 8, 9, 10 = 6

Let E be the event that the arrow will point a number greater than 4.

Number of outcomes favourable to E = 6

Number of all possible outcomes = 10

$$P(E) = \frac{\text{Number of outcomes favourable to E}}{\text{Number of all possible outcomes}}$$

$$= \frac{6}{10} = \frac{3}{5}$$

(iv) The number less than, 8 are 1, 2, 3, 4, 5, 6, 7

Let E be the event that the arrow will point a number less than 9.

Number of outcomes favourable to E = 7

Number of all possible outcomes = 10

$$P(E) = \frac{\text{Number of outcomes favourable to E}}{\text{Number of all possible outcomes}}$$

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

3 Sol. Probability that the 3 students have the same birthday.

= 1 – probability that the 3 students do not have the same birthday

= 1 – 0.526

= 0.474

4 Sol. (i) Number of 50p coins = 200

Number of ₹ 1 coins = 100

Number of ₹ 2 coins = 50

Number of ₹ 5 coins = 20

∴ Total number of coins

= 200 + 100 + 50 + 20

= 370

Number of outcomes favourable to 50p coins

To fall down = 200

∴ Probability for a 50p coin to fall down.

$$= \frac{\text{No. of favourable outcomes}}{\text{No. of total outcomes}}$$

$$= \frac{200}{370} = 0.54$$

(ii) Let P(E) be the probability for ₹ 5 coin

To fall down

No. of outcomes favourable to ₹ 5 coin = 20

∴ probability for a ₹ 5 coin to fall down.

$$= \frac{\text{No. of favourable outcomes}}{\text{No. of Total outcomes}}$$

$$= \frac{20}{370} = 0.05$$

Then $P(\bar{E})$ is the probability of a coin.

Which fall down is not a ₹ 5 coin.

We know that, $P(\bar{E}) + P(E) = 1$

$$P(\bar{E}) = 1 - (P(E))$$

$$= 1 - 0.05$$

$$= 0.95$$

5. Sol. Total number of bulbs = 40

∴ No of all possible outcomes = 40

(i) Let E be the event that the bulbs drawn at random from the lot is defective.

Then, the number of outcomes favourable to E = 10

$$\therefore P(E) = \frac{\text{No. of outcomes favourable to E}}{\text{No. of all possible outcomes}}$$

$$= \frac{10}{40} = \frac{1}{4}$$

(ii) As one bulb is selected at random from the rest

Total number of bulbs = 40 – 1 = 39

Number of defective bulbs = 10

Let E be the event that the bulb selected is not defective.

Then the number of outcomes favourable to E is 29.

Since, now there are 39 – 10 = 29 bulbs which are not defective.

$$\therefore P(E) = \frac{\text{No. of outcomes favourable to E}}{\text{No. of all possible outcomes}}$$

$$= \frac{29}{39}$$

II. Multiple Choice Questions

1. A	2. B	3. B	4. C
5. C	6. C	7. C	8. B
9. D	10. B	11. A	12. D
13. A	14. D	15. C	16. C

CHAPTER – 14

Statistics

Similar Practice Questions :

Exercise – 14.1 to 14.4

1. 39
2. 25.75
3. 41
4. 145
5. 48.3
6. 149.3
7. 113.7
8. 21.75
9. 157.8
10. 537.5
11. Hint : Mark the points with coordinates : (Upper limit, corresponding cumulative frequency)
12. Hint : Mark the points with coordinates : (Lower limit, corresponding cumulative frequency)
13. 24
14. 41.75
15. 73.75
16. 28
17. 15.5
18. 19.5
19. 5
20. i) 21 ii) 28
21.

Cl	f
0 - 10	6
10 - 20	9
20 - 30	15
30 - 40	9
40 - 50	14
50 - 60	17

22. Hint :

Less than type		More than type	
Upper limits	**Cumulative frequency**	**Lower limits**	**Cumulative frequency**
15	3	10	55
20	10	15	52
25	26	20	45
30	38	25	29
35	47	30	17
40	52	35	8
45	55	40	3

Creative zone :

I. 1.

Class	Frequency	x_i	f_ix_i	
0 - 20	3	10	30	
20 - 40	5	30	150	
40 - 60	13	50	650	
60 - 80	06	70	420	
80 - 100	01	90	90	
100 - 120	04	110	440	
Total	$\Sigma f_i = 32$		$\Sigma f_ix_i = 1780$	

We know $\bar{x} = \frac{\Sigma f_i x_i}{\Sigma f_i}$

$= \frac{1780}{32}$

$= 55.625$

2.

Class	Frequency	x_i	$d=x_i-a$	$u=\frac{x_i-a}{h}$	f_iu_i
0 - 40	5	20	–80	–2	–10
40 - 80	20	60	–40	–1	–20
80 - 120	38	100(a)	0	0	0
120 - 160	30	140	40	1	30
160 - 200	06	180	80	2	12

Here $\Sigma f_i = 99$; $\Sigma f_iu_i = 12$; a = 100; h = 40

We know $= a + \left[\frac{\Sigma f_i u_i}{\Sigma f_i}\right] \times h$

$= 100 + \left[\frac{12}{99}\right] \times 40$

$= 100 + \frac{480}{99}$

$= 100 + 4.85$

$= 104.85$

3.

Class Interval	Frequency	Cumulative Frequency
10 - 50	10	10
50 - 100	22	32
100 - 150	30	62
150 - 200	32	96
200 - 250	12	108
250 - 300	02	110

Here n = 110; $\frac{n}{2} = \frac{110}{2} = 55$

and median lines on = 150 – 200

Lower limit / = 150

f = 32

c f = 62

Hight h = 50

We know median $= / + \left[\frac{\frac{n}{2} - c\,f}{f}\right] \times h$

$= 150 + \frac{(55-62)\times 50}{32}$

$= 150 - \frac{350}{32}$

$= 150 - 10.9 = 139.1$

4.

Class Interval	Frequency
10 - 60	7
60 - 120	13
120 - 180	20
180 - 240	32
240 - 300	17
300 - 360	08
360 - 120	05

Here $l = 180$; $f_1 = 32$; $f_0 = 20$; $f_2 = 17$

and h = 60

We know mode $= l + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] \times h$

$= 180 + \left[\frac{32 - 20}{64 - 20 - 17}\right] \times 60$

$= 180 + \left[\frac{12 \times 60}{27}\right]$

$= 180 + \frac{720}{27}$

$= 180 + 26.66$

$= 206.66$

5. Given Mean = 10.5

Mode = 17

Median = ?

We know Mode = 3 (Median)–2(Mean)

Median $= \frac{\text{Mode} + 2(\text{Mean})}{3}$

Median $= \frac{17 + 2(10.5)}{3}$

$= \frac{17 + 21}{3} = \frac{38}{3} = 12.6$

6. Mode is 21

7. Ascending order 25, 26, 30, 100, 101, 720, 1000

Median = 100

8. Ascending order 1, 4, 5, 6, 10, 19

Here in midile two numbers have 30.....

Median $= \frac{5+6}{2} = \frac{11^{10.5}}{2} = 10.5$

9.

Class Interval	Frequency	Cumulative Frequency
More than or equal to 10	5	80
More than or equal to 20	10	75
More than or equal to 30	20	65
More than or equal to 40	10	45
More than or equal to 50	5	35
More than or equal to 60	30	30

Points to be plotted on the points are

(10,80) (20,75) (30, 65) (40, 45) (50, 35) (60,30)

II.

1) D	2) B	3) A	4) D	5) C
6) B	7) A	8) D	9) C	10) B
11) B	12) D	13) C	14) A	15) B
16) D	17) A	18) C		

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