SECTION A

1. **(d)**
2. **(b)**
3. **(b)**
4. **(b)**
5. **(c)**
6. **(c)**
7. **(a)**
8. **(d)**
9. **(c)**
10. **(c)**
11. **(b)**
12. **(c)**
13. **(d)**
14. **(d)**
15. **(d)**
16. **(a)**
17. **(b)**
18. **(b)**
19. **(a)**
20. **(c)**

SECTION B

21. (a) $x\left(\frac{1}{2}\right)+y(1)+\frac{1}{2}-1=5$

$\Rightarrow x+2y=11$

OR

(b) $\frac{(\sqrt{3})^2}{\left(\frac{\sqrt{3}}{2}\right)^2+\left(\frac{\sqrt{3}}{2}\right)^2}$

$=2$

22. $\frac{1}{3}(3x^2+4x-4)$

$=\frac{1}{3}(3x^2+6x-2x-4)$

$=\frac{1}{3}(3x-2)(x+2)$

Zeroes are $\frac{2}{3}, -2$

23. radius $=5\sqrt{2}$ units

$(2a-11)^2+(a-7+9)^2=50$

$\Rightarrow a^2-8a+15=0$

$\Rightarrow (a-5)(a-3)=0$

$\Rightarrow a=5,3$

24. (a) $\frac{6}{\text{PQ}}=\frac{4}{\text{QR}}=\frac{8}{6}$

$\Rightarrow \text{PQ}=\frac{9}{2}$ cm or 4.5 cm

and QR $=3$ cm

PQ + QR $=7.5$ cm

OR

(b) In $\triangle$ PQR, $\angle 1=\angle 2 \therefore$ PR $=$ PQ

$\frac{\text{QR}}{\text{QS}}=\frac{\text{QT}}{\text{PR}} \Rightarrow \frac{\text{QR}}{\text{QS}}=\frac{\text{QT}}{\text{PQ}}$

Also, $\angle 1 = \angle 1$

$\Delta PQS \sim \Delta TQR$

25. $\angle OAP = 90°$

In right $\triangle$ OAP,

$(26)^2 = OA^2 + (10)^2$

$\Rightarrow OA = \sqrt{576} = 24$

radius $= 24$ m

SECTION C

26. (a) In $\triangle$ OAC,

$OA = OC$

$\Rightarrow \angle OCA = \angle OAC$

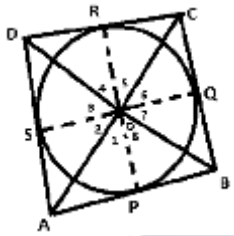
Now, $\angle OCD = 90°$

$\Rightarrow \angle OCA + \angle ACD = 90°$

$\Rightarrow \angle OAC + \angle ACD = 90°$

or$\angle BAC + \angle ACD = 90°$

OR



(b)

$\Delta OAP \cong \Delta OAS$

$\angle 1 = \angle 2$

Similarly, $\angle 3 = \angle 4, \angle 5 = \angle 6, \angle 7 = \angle 8$

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

$\Rightarrow 2(\angle 1 + \angle 4 + \angle 5 + \angle 8) = 360°$

$\Rightarrow \angle AOB + \angle COD = 180°$

Similarly, $\angle BOC + \angle AOD = 180°$

27. (a) LHS $= \frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta}$

$$= \frac{\frac{\sin\theta}{\cos\theta}}{1-\frac{\cos\theta}{\sin\theta}} + \frac{\frac{\cos\theta}{\sin\theta}}{1-\frac{\sin\theta}{\cos\theta}}$$

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

$$= \frac{1}{(\sin\theta-\cos\theta)}\left[\frac{\sin^3\theta-\cos^3\theta}{\sin\theta\cos\theta}\right]$$

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

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

$= 1 + \sec\theta\,\text{cosec}\theta =$ RHS

OR

(b) LHS $= \frac{\sin A+\cos A}{\sin A-\cos A} + \frac{\sin A-\cos A}{\sin A+\cos A}$

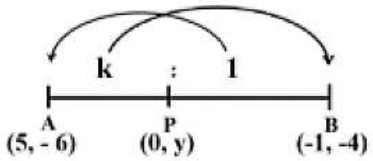
$$= \frac{(\sin A+\cos A)^2 + (\sin A-\cos A)^2}{(\sin A-\cos A)(\sin A+\cos A)}$$

$$= \frac{\sin^2 A+\cos^2 A+2\sin A\cos A+\sin^2 A+\cos^2 A-2\sin A\cos A}{\sin^2 A-\cos^2 A}$$

$$= \frac{1+1}{\sin^2 A-(1-\sin^2 A)}$$

$= \frac{2}{2\sin^2 A - 1} = RHS$

28.



Let the ratio be k: 1 and point on y - axis be $P(0, y)$

$0 = \frac{-k + 5}{k + 1}$

$k = 5$

Hence, ratio is $5:1$

$y = \frac{-4(5) - 6}{5 + 1} = \frac{-26}{6} = \frac{-13}{3}$

Coordinates of point of intersection are $P\left(0, -\frac{13}{3}\right)$

29. Let $\frac{1}{\sqrt{5}}$ be a rational number.

$\frac{1}{\sqrt{5}} = \frac{p}{q}$, where $q \neq 0$ and let p&q be the co-primes.

$5p^2 = q^2 \Rightarrow q^2$ is divisible by 5 .

$\Rightarrow$ q is divisible by 5 . …….. (i)

let $q = 5a$, where ' a ' is some integer.

$25a^2 = 5p^2 \Rightarrow p^2 = 5a^2 \Rightarrow p^2$ is divisible by 5 .

$\Rightarrow p$ is divisible by 5 …….. (ii)

(i) and (ii) leads to contradiction as p and q are coprimes.

$\frac{1}{\sqrt{5}}$ is an irrational number

30. Let r is the radius of hemisphere and cylinder and h is the height of cylinder

$h = 2r$

Volume of air in room $= \frac{2}{3}\pi r^3 + \pi r^2 h$

$\frac{1408}{21} = \frac{2}{3}\pi r^3 + \pi r^2 (2r)$

$\frac{1408}{21} = \frac{8}{3} \times \frac{22}{7} \times r^3$

$r^3 = 8$

$r = 2m$

and $h = 4m$

31. Total outcomes $= 36$

Number of Outcomes with difference of the numbers on the two dice is $2 = 8$

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

$P($ difference of the numbers on the two dice is 2$) = \frac{8}{36}$ or $\frac{2}{9}$

SECTION D

32. Let Vijay invested ₹ x at 8% rate of interest & ₹ y at 9% rate of interest ATQ,

$\frac{8x}{100} + \frac{9y}{100} = 1860$

or $8x + 9y = 186000$ ……. (i)

$\frac{9x}{100} + \frac{8y}{100} = 1880$

or $9x + 8y = 188000$ ……. (ii)

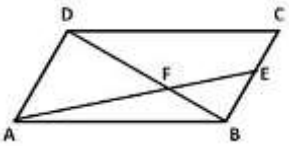
On solving (i) and (ii), we get

$x = 12000$

$y = 10000$

Hence, money invested in scheme A is ₹ 12000 and scheme B is ₹ 10000 .

33. (a)



In $\triangle ADF$ and $\triangle EBF$,

$\angle DFA = \angle EFB$

$\angle ADF = \angle FBE$

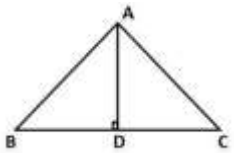
$\therefore \Delta ADF \sim \Delta EBF$

$\therefore \frac{DF}{FB} = \frac{FA}{EF}$

$\Rightarrow DF \times EF = FB \times FA$

OR

(b)



$AD^2 = BD \times DC$

$\frac{AD}{DC} = \frac{BD}{AD}$

Also, $\angle ADB = \angle ADC$

$\triangle DBA \sim \triangle DAC$

$\angle DBA = \angle DAC$

$\angle BAD = \angle DCA$

Adding both

$\angle DBA + \angle DCA = \angle DAC + \angle BAD$

$\angle BAC = 90°$

34. (a) Let the other two sides be x cm and y cm ATQ

$x + y + 25 = 60$

$y = 35 - x$

Now,

$x^2 + y^2 = (25)^2$

$x^2 + (35 - x)^2 = 625$

$x^2 - 35x + 300 = 0$

$(x - 20)(x - 15) = 0$

$\Rightarrow x = 20,15$

$x = 20 \Rightarrow y = 15$

$x = 15 \Rightarrow y = 20$

Hence sides are 15 cm and 20 cm.

OR

(b) Let the speed of train be $\times$ km/h

Reduced speed of train $= (x - 8)$km/h

ATQ

$\frac{480}{x-8} - \frac{480}{x} = 3$

$x^2 - 8x - 1280 = 0$

$(x - 40)(x + 32) = 0$

$\Rightarrow x = 40$

Speed of train $= 40$ km/h

35.

Daily Allowance	x_i	f_i	$f_i x_i$

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

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

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

$f = 20$

modal class is $19 - 21$

mode $= 19 + \frac{20 - 13}{40 - 13 - 5} \times 3$

$= 19.95$ approx

SECTION E

36. A.P formed is 300,350,400 ... ...

(i) $a_4 = 450$

$a_5 = 500$

$a_6 = 550$

(ii) $a_8 = 300 + 7 \times 50$

$= 650$ m

(iii) (a) $S_{10} = \frac{10}{2} \times (2 \times 300 + 9 \times 50)$

$= 5250$ m

OR

(b) $S_6 = \frac{6}{2} \times (2 \times 300 + 5 \times 50)$

$= 2250$ m

37. (i) central angle $= \frac{360^\circ}{10} = 36^\circ$

(ii) length of arcACB $= \frac{1}{10} \times 2 \times \frac{22}{7} \times \frac{35}{2} = 11$ mm

(iii)(a) Area of each sector of the brooch $= \frac{1}{10} \times \frac{22}{7} \times \frac{35}{2} \times \frac{35}{2} = \frac{385}{4}$ mm^2 or 96.25 mm^2

OR

(b) length of silver wire used $= 2 \times \frac{22}{7} \times \frac{35}{2} + 5 \times 35$

$= 285$ mm

38. (i) $\frac{h}{BD} = \tan 45^\circ = 1$

$\Rightarrow$ BD $= h$ m

(ii) $\frac{h}{BC} = \sin 45^\circ = \frac{1}{\sqrt{2}}$

$\Rightarrow$ BC $= \sqrt{2}\, h$ m

(iii)(a) $\tan 60^\circ = \frac{EC}{AE}$

$\Rightarrow \sqrt{3} = \frac{h + 40}{h}$

$\Rightarrow \quad h = 20(\sqrt{3} + 1) = 20 \times 2.73 = 54.6$ m

$CE = 54.6 + 40 = 94.6$ m

OR

(b) $\cos 60° = \frac{AE}{AC}$

$\Rightarrow \frac{1}{2} = \frac{AE}{100}$

$AE = 50$ m