SOLUTIONS

1. $(3)^2-(\sqrt{3})^2$

   $\Rightarrow 6$

2. $\sqrt[12]{4^4}$ or $\sqrt[12]{5^3}$

   $\sqrt[12]{256}$ or $\sqrt[12]{125}$

   $\therefore \sqrt[3]{4} > \sqrt[4]{5}$

3. $\left(\frac{5}{6}\right)^{x}\left(\frac{5}{6}\right)^{2x}=\left(\frac{5}{6}\right)^{3}$

   $x=3$

4. $(1)^2 - 5(1) + 7$

   Remainder = 3

5. $\left(\frac{5}{2},0\right)$

   OR

   a = -1

6. One or No

7. P [not E] = 1-p [E]

   = 0.63

8. $3x+15 = 90°$

   $x = 25°$

   or

   $x+57=180°$

   $x = 123°$

9. $3x+2x = 180°$

   $x = \left(\frac{180}{5}\right)$

   = 108°, 72°

10. $\angle B = \angle C$

    $\therefore$ ABC = 60°

    OR

    AB is largest side

11. No, because sum of two sides is equal to third side

12. 15°+90°+x = 180°

    x=75°

13. 60°, 120°, 60°, 120°

14. x=20° or Semicircle

15. Chord = $4\sqrt{5}$cm

16. 300%

17. (a) (iii) 23
    (b) (ii) 12.35
    (c) (i) 12.5
    (d) (iv) 16
    (e) (ii) 20 students

18. (a) (ii) 15m
    (b) (iii) 562.7m^2
    (c) (i) 226.3m^2
    (d) (iii) 792m^2
    (e) (iv) ₹7920

19. (a) (iii) 120°
    (b) (ii) 180°
    (c) (iii) 15cm
    (d) (ii) 5cm
    (e) (i) $5\sqrt{3}$cm

20. (a) (ii) (5,7)
    (b) (iii) 4m
    (c) (ii) 9m
    (d) (iii) 18
    (e) (iv) 30m

Part B

21. Let $x = 0.4\overline{7}$
    $10x = 4.\overline{7}$
    $100x = 47.\overline{7}$
    $90x = 43$
    $x = \left(\frac{43}{90}\right)$

    or
    $(256)^{0.25}$
    $\Rightarrow (4^4)^{\frac{25}{100}}$
    $\Rightarrow (4^4)^{¼}$
    $\Rightarrow$ 4 Ans

22. $x + \frac{1}{x} = 7$
    squaring both sides
    $x^2 + \frac{1}{x^2} + 2 = 49$

$x^2 + \frac{1}{x^2} = 47$

OR

$\left(\frac{1}{3}x + 3y\right)^3$

$= \left(\frac{1}{3}x\right)^3 + (3y)^3 + 3\left(\frac{1}{3}x\right)^2(3y) + 3\left(\frac{1}{3}x\right)(3y)^2$

$= \frac{1}{27}x^3 + 27y^3 + x^2y + 9xy^2$

23. 2x-y=4

Put x = O $\Rightarrow$ 2 (O) -y = 4

y = -4

Put y = o $\Rightarrow$ 2x-0 = 4

x=2

Put x=1 $\Rightarrow$ 2(1)-y = 4

y=-2

Put y=2 $\Rightarrow$ 2x-2=4

x=3

x	0	2	1	3
y	-4	0	-2	2

24. AOC + BOC = 180 (Linear Pair)

2 $\angle$COP + 2 $\angle$QOC = 180°

$\left(\begin{array}{l}\therefore \text{OP bisects } \angle BOC \\ \text{OQ bisects } \angle AOC\end{array}\right)$

$\angle$COP + $\angle$QOC = 90°

$\Rightarrow \angle POQ = 90°$

25. 2x+3x+4x = 180° (Angle sum property)

x=20°

$\therefore$ Angles : 40°, 60°, 80°

26.

Result	Tally Marks	Frequency
0	𝍸 I	6
1	𝍸 𝍸	10
2	𝍸 IIII	9
3	𝍸	5
		30

27. L.H.S.

$= \frac{3}{\sqrt{3}+1} \times \frac{\sqrt{3}-1}{\sqrt{3}-1} + \frac{5}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1}$

$= \frac{3\sqrt{3}-3}{2} + \frac{5\sqrt{3}+5}{2}$

$= \frac{3\sqrt{3}-3+5\sqrt{3}+5}{2}$

$= \frac{8\sqrt{3}+2}{2} = 4\sqrt{3}+1$

Now $4\sqrt{3}+1 = a+b\sqrt{3}$

$\Rightarrow a=1; b=4$

28. $(x+1)$, is one factor of $x^3+6x^2+11x+6$

$$
\begin{array}{l|l}
x+1 & x^3+6x^2+11x+6 \;\backslash\; x^2+5x+6 \\
 & \underline{-x^3 \pm x^2} \\
 & \quad 5x^2+11x+6 \\
 & \quad \underline{-5x^2 \pm 5x} \\
 & \quad\quad 6x+6 \\
 & \quad\quad \underline{-6x \pm 6} \\
 & \quad\quad\quad 0
\end{array}
$$

$x^3+6x^2+11x+6 = (x+1)(x^2+5x+6)$

$= (x+1)(x+2)(x+3)$

29. $(a+b+c)^2 = (12)^2$

$a^2+b^2+c^2+2(ab+bc+ca) = 144$

$90+2(ab+bc+ca) = 144$

$ab+bc+ca = 27$

Now $a^3+b^3+c^3-3abc = (a+b+c)(a^2+b^2+c^2-ab-bc-ca)$

$= 12[90-27]$

$= 756$

30. In ΔABC

$\angle 1+\angle 2+\angle 3=180°$ ——— ①

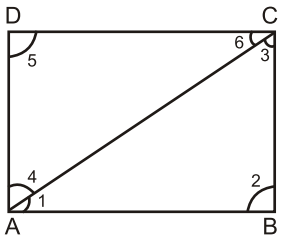
(Angle sum property)

In ADC

$\angle 4+\angle 5+\angle 6 = 180°$ ——— ②

Adding 1 & 2

$\angle 1+\angle 2+\angle 3+\angle 4+\angle 5+\angle 6 = 180°+180°$



$\angle A+\angle B+\angle C+\angle D = 360°$

OR

In Δ's AOD and ΔCOB

AO = OC (Given)

OD = OB (Given)

$\angle AOD = \angle COB$ (Vertically Opposite Angles)

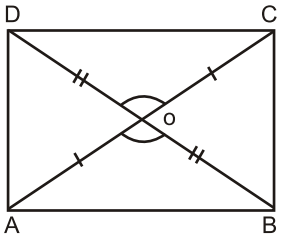
$\Rightarrow \Delta AOD \cong \Delta COB$ by SAS

$\Rightarrow \angle OAD = \angle OCB$ by C.P.C.T

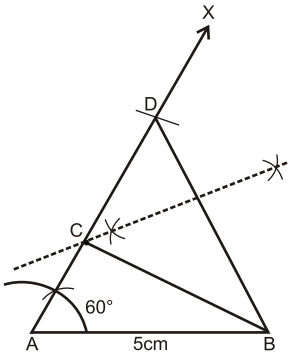
But this makes alternate angles

$\therefore$ AD || BC

Hence ABCD is a parallelogram



31.



32. $S = \frac{16+30+32}{2}$

$= 40$

ar of $\Delta = \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{40\ (40-16)\ (40-30)\ (40-34)}$

$= \sqrt{40x24x10x6}$

$= \sqrt{2x2x2x5x2x2x2x3x5x2x2x3}$

$= 240$ sq cm

33. (i) $\frac{46}{100} = 0.46$ (ii) $\frac{31}{100} = 0.31$ (iii) $\frac{39}{100} = 0.39$

OR

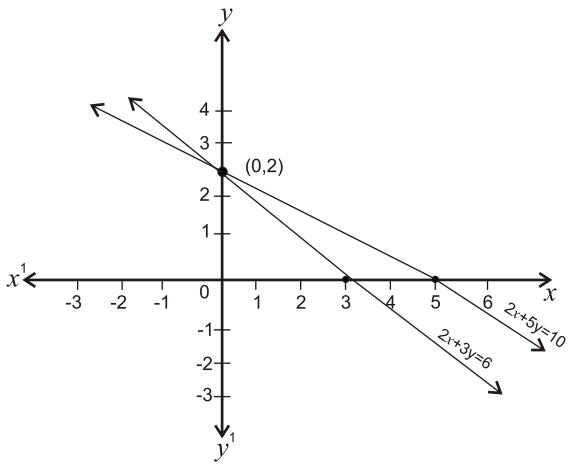
(i) $\frac{27}{54} = \frac{1}{2}$ (ii) $\frac{42}{54} = \frac{21}{27}$

34. $2x+5y=10 \Rightarrow y = \frac{10-2x}{5}$

$2x+3y=6 \Rightarrow y = \frac{6-2x}{3}$

x	0	5
y	2	0

x	0	3
y	2	0

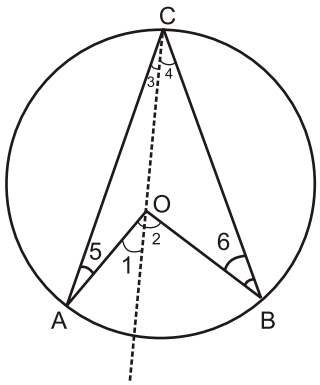


Point of intersection is (0,2)

35. Given : Arc $\overset{\frown}{AB}$ of a circle with centre O subtends $\angle AOB$ at the centre and $\angle ACB$ on the remaining part of the circle

To prove : $\angle AOB = 2\angle ACB$

Construction : Join CO and produce it to Q.



Proof : In $\angle OAC$, OA=OC

$\therefore \angle 3 = \angle 5$

Also, $\angle 1 = \angle 3 + \angle 5$

or $\angle 1 = \angle 3 + \angle 3$

$\angle 1 = 2\angle 3$ ----------(i)

Similarly, $\angle 2 = 2\angle 4$ ----------(ii)

Adding (i) and (ii)

$\angle 1 + \angle 2 = 2(\angle 3 + \angle 4)$

$\Rightarrow \angle AOB = 2\angle ACB$ Hence proved

$x = \frac{1}{2}(50° + 30°)$

$x = 40°$

36. Here, $r = \frac{84}{2} = 42cm = 0.42m$

h = 1.5m

C.S.A of road roller $= 2x\frac{22}{7} x\ 0.42\ x\ 1.5$

$= 3.96m^2$

Area of ground = $3.96 \times 100 = 396m^2$

Cost of frequency = 396 x 2.50 = ₹990

OR

let radius of cone = $3x$

and height of cone = $4x$

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

$301.44 = \frac{1}{3} \times 3.14 \times 3x \times 3x \times 4x$

$301.44 = 3.14 \times 12x^3$

$x^3 = \frac{301.44}{3.14 \times 12} = 8$

$\Rightarrow x = 2$

radius = $3 \times 2 = 6$cm

height = $4 \times 2 = 8$cm

$l = \sqrt{6^2+8^2} = \sqrt{100} = 10$cm

CSA = $\pi rl = 3.14 \times 6 \times 10 = 188.4 cm^2$