Solution

Section A

1.
(d) $\frac{1}{3}$
Explanation: Let $x = 0.\overline{3}$
i,e, x = 0.333...---(i)
multiply eq.(i) by 10 we get,
10 x = 3.333... ---(ii)
Subtracting eq. (i) from (ii) we get
10 x -x = 3.333... - 0.333...
9 x = 3
$x = \frac{3}{9}$
$x = \frac{1}{3}$

2.
(c) many
Explanation: There are many lines pass through the point (2, 14).
For example
x - y = -12
2x + y = 18
and many more.

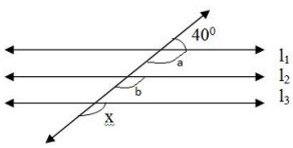
3.
(d) (0,3)
Explanation: Since the point lies on y-axis, so, x = 0. Hence, the required point is: (0, 3)

4. **(a)** X-axis
Explanation: Histogram states that a two dimensional frequency density diagram is called as a histogram. The histograms are diagrams which represent the class interval and the frequency in the form of a rectangle. There will be as many adjoining rectangles as there are class intervals.

5.
(d) (3, 7)
Explanation: Let us put x = 3 in the give equation,
Then, y = 2(3) + 3
y = 6 + 3 = 9
So, the point will be (3, 9)
For x = 3, y = 9. But in the given option, y = 7
So, the given point (3, 7) will not lie on the line y = 2x + 3.

6.
(b) 465
Explanation: Euclid's Elements is a mathematical and geometric treatise consisting of 13 books attributed to the ancient Greek mathematician Euclid in Alexandria, Ptolemaic Egypt circa 300 BC. It is a collection of definitions, postulates (axioms), propositions (theorems and constructions), and mathematical proofs of the propositions. There are 131 definitions, 465 propositions ,5 Postulates and 5 common notions in Euclid's Elements.

7. **(a)** 140^0

Explanation: 

In the given figure

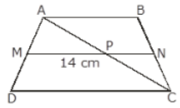
40° + ∠a = 180° (linear - pair)
Therefore ∠a = 180° - 40° = 140°
Now ∠a = ∠b (corresponding - angles)
Similarly ∠b = ∠x = 140°
Therefore $\angle x$∠x = 140°

8.

(d) 16 cm

Explanation:

Given,



ABCD is a trapezium
AB || DC
M, N are mid points of AD & BC
AB = 12 cm, MN = 14 cm
∵ AB || MN || CD [M, N are mid points of AD &BC]
MP = NP
By mid point theorem,
MP = $\frac{1}{2}$CD and NP = $\frac{1}{2}$AB
∴ MN = $\frac{1}{2}$(AB + CD)
⇒ 14 = $\frac{1}{2}$ (12 + CD)
⇒ CD = 28 - 12 = 16 cm

9.

(c) 5

Explanation: $x^3 + \left(\frac{1}{x^3}\right) = 110$

$x^3 + \left(\frac{1}{x^3}\right) + 3x \cdot \frac{1}{x}\left(x + \frac{1}{x}\right) = 110 + 3x \cdot \frac{1}{x}\left(x + \frac{1}{x}\right)$

⇒ $\left(x + \frac{1}{x}\right)^3 = 110 + 3\left(x + \frac{1}{x}\right)$

⇒ $\left(x + \frac{1}{x}\right)^3 - 3\left(x + \frac{1}{x}\right) - 110 = 0$

Let $x + \frac{1}{x} = a$

⇒ a^3 - 3a -110=0

⇒ $a^3 - 5a^2 + 5a^2$ - 25a + 22a - 110 = 0

⇒ a^2(a - 5) + 5a(a - 5) + 22(a - 5) = 0

⇒ (a - 5)(a^2 + 5a + 22) = 0

⇒ a - 5 = 0 or a^2 + 5a + 22 = 0 neglected)

⇒ a=5

⇒ $x + \frac{1}{x} = 5$

10.

(c) 3

Explanation: If (-2, 5) is a solution of 2x + my = 11
then it will satisfy the given equation
2 .(-2)+5 m=11
-4+5 m=11
5 m=11+4
5 m=15
$m = \frac{15}{5} = 3$
m=3

11.

(d) 50°

Explanation: In Rhombus, digonals bisect each other right angle. By using angle sum property in any of the four triangles formed by intersection of diagonals, we get ∠CBD = 50 and ∠CBD = ∠ADC (alternate angles).

So, ∠ADC = 50

12.

(d) Diagonals of PQRS are at right angles.

Explanation: Diagonals of PQRS are at right angles form all the internal angles as right angles. [according to angle property of rectangle, i.e, all the angles of a rectangle are right angle(90^0)]

13.

(c) $\frac{1}{3}$ of the circle

Explanation: Complete the cyclic quadrilateral PQRS, with S being a point on a point on the major arc. Then

$\angle S=60^0$ (Opposite angles of a cyclic quadrilateral)

Then Major $\angle POR=120^0$

Thus fraction the minor arc $=\frac{120^0}{360^0}=\frac{1}{3}$

14.

(d) $\frac{7}{9}$

Explanation: $0.\overline{3}+0.\overline{4}$

$=0.\overline{7}=\frac{7}{9}$

15.

(b) (3,0)

Explanation: 2x + 3y = 6 meets the X-axis.

Put y = 0,

2x + 3(0) = 6

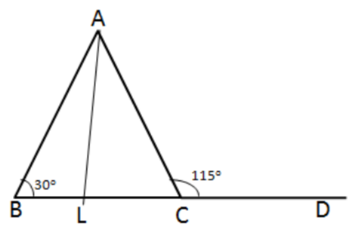
x = 3

Therefore, graph of the given line meets X-axis at (3, 0).

16.

(d) $72\frac{1}{2}^{\circ}$

Explanation:



∠C = 180° - ∠ACD = 180° - 115° = 65°

In △ABC

∠A + ∠B + ∠C = 180°

⇒ ∠A = 180 - 30° - 65°

⇒ ∠ A = 85°

Now in △ALC

∠ALC + ∠LAC + ∠C = 180°

⇒ ∠ALC = 180° - ∠LAC - ∠C

$= 180^{\circ}-\frac{\angle A}{2}-\angle C$

$= 180^{\circ}-\frac{85^{\circ}}{2}-65^{\circ}$

$= \frac{145^{\circ}}{2}$

$= 72\frac{1}{2}^{\circ}$

17.

(c) 5 cm

Explanation: Use unitary method
0.25 cm - 100 people
So 1 cm - 400 people
So for 2000 people:
$\frac{2000}{400}$ = 5 cm

18. **(a)** 1 : 4
Explanation: Ratio of volume of spheres = (ratio of radius)^3
Given, ratio of volumes of two spheres is 1: 8
$\Rightarrow$ (ratio of radius)^3 = 1 : 8
$\Rightarrow$ ratio of radius = 1 : 2
Ratio of surface area = (ratio of radius)^2
$\Rightarrow$ Ratio of surface area = 1 : 4

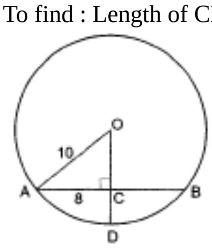
19. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: 510 = a + b + c
510 = 25x + 14x + 12x
510 = 51x
x = 10
Three side of the triangle are
25x = 25 $\times$ 10 = 250 cm
14x = 14 $\times$ 10 = 140 cm and
12x = 12 $\times$ 10 = 120 cm
s = $\frac{250+140+120}{2}$ = 255 cm
Area = $\sqrt{255 \times 5 \times 115 \times 135}$
= 4449.08 cm^2

20.
(b) Both A and R are true but R is not the correct explanation of A.
Explanation: Through a point infinite lines can be drawn. Through (2, 14) infinite number of lines can be drawn. Also a line has infinite points on it hence a linear equation representing a line has infinite solutions.

Section B

21. The perimeter of the given equilateral triangle = 60 cm
As every side of the equilateral triangle is equal.
Length of each of its sides $= \frac{60}{3}\text{cm}$ = 20 cm.
Area of equilateral triangle = $\frac{\sqrt{3}}{4}$a^2 = $\frac{1.732}{4}$(20)^2 = 173.2 cm^2 ......(1)
Let the height of the given triangle be h cm. Then
its area = ($\frac{1}{2}\times$ base $\times$ height) $= \left(\frac{1}{2} \times 20 \times h\right)$ cm^2
$\therefore \frac{1}{2} \times 20 \times h =$ 173.2 cm^2 [from (1)]
$\Rightarrow h = \frac{173.2}{10}$
$\Rightarrow$ height = 17.32 cm
Hence, the height of the given triangle is 17.32 cm

22. Given : In given figure OA=10cm and Ab=16 cm
To find : Length of CD



Solution : As OD $\perp$AB
$\Rightarrow$ AC = CB
($\perp$ from the centre to the chord bisects the chord)

$\therefore$AC = $\frac{AB}{2}$ = 8

In right $\triangle$OCA,

$OA^2 = AC^2 + OC^2$

$(10)^2 = 8^2 + OC^2$

$OC^2 = 100 - 64$

$OC^2 = 36$

$\therefore$OC = $\sqrt{36}$

OC = 6 cm

CD = OD - OC = 10 - 6 = 4 cm.

23. For conical pit : Diameter = 3.5 m.

$\therefore$ Radius (r) = $\frac{3.5}{2}$m = 1.75 m

Depth (h) = 12 m

$\therefore$ Capacity of the conical pit = $\frac{1}{3}\pi r^2 h$

$\frac{1}{3} \times \frac{22}{7} \times (1.75)^2 \times 12\, m^3$

= 38.5 m^3 = 38.5 $\times$ 1000 l

= 38.5 kl.

24. $\angle BDC = \angle BAC = 40^\circ$ [$\angle$ in the same segment].

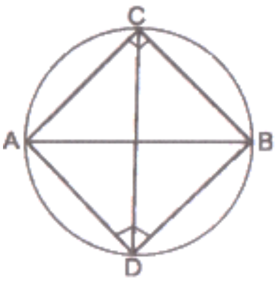
$\angle BDC + \angle DBC + \angle BCD = 180^\circ$

$\therefore 40^o + 80^o + x^o = 180^o$

=> $x^o = 60^o$.

OR

The figure is shown below:



In right triangles ACB and ADB, we have

$\angle ACB = 90^\circ$ and $\angle ADB = 90^\circ$

$\therefore \angle ACB + \angle ADB = 90^\circ + 90^\circ = 180^\circ$

Since, we know that if the sum of any pair of opposite angles of a quadrilateral is 180^o then, the quadrilateral is cyclic. So, ADBC is a cyclic quadrilateral.

Now on Joining CD, we can say that the angles $\angle BAC$ and $\angle BDC$ are made by $\widehat{BC}$ in the same segment.

Therefore, $\angle BAC = \angle BDC$ [$\because$ Angles in the same segment of a circle are equal]

Hence proved

25. We need to express the linear equation $2x = -5y$ in the form ax + by + c = 0 and indicate the values of a, b and c.

$2x = -5y$ can also be written as $2x + 5y + 0 = 0$.

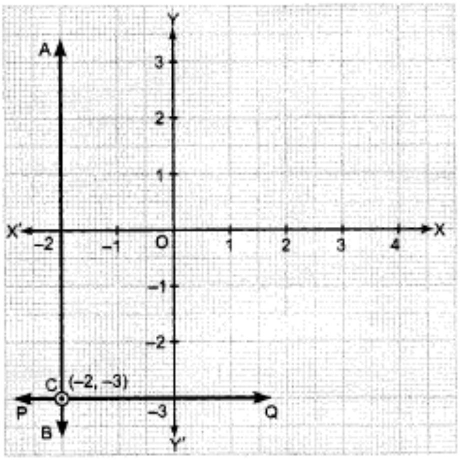
We need to compare the equation $2x + 5y + 0 = 0$ with the general equation ax + by + c = 0, to get the values of a, b and c.

Therefore, we can conclude that $a = 2, b = 5$ and $c = 0$

OR

AB$\Rightarrow$x=-2

PQ$\Rightarrow$y=-3



Point of intersection of AB and PQ is $C(-2,-3)$.

Section C

26. Given, $a=\frac{2+\sqrt{5}}{2-\sqrt{5}}$

$\Rightarrow a=\frac{2+\sqrt{5}}{2-\sqrt{5}}\times\frac{2+\sqrt{5}}{2+\sqrt{5}}$

$=\frac{(2+\sqrt{5})^2}{2^2-(\sqrt{5})^2}$

$=\frac{4+5+4\cdot\sqrt{5}}{4-5}$

$=-(9+4\sqrt{5})$

Also, $b=\frac{2-\sqrt{5}}{2+\sqrt{5}}$

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

$=\frac{(2-\sqrt{5})^2}{2^2-(\sqrt{5})^2}$

$=\frac{2^2+(\sqrt{5})^2-2.2\sqrt{5}}{4-5}$

$=\frac{4+5-4\sqrt{5}}{-1}$

= -(9-4$\sqrt{5}$)

= 4$\sqrt{5}$-9

We know, $a^2 - b^2$ = (a + b) (a - b)

Here, a + b = -9 -4 $\sqrt{5}$ + 4$\sqrt{5}$-9= - 18

a - b = -9 -4$\sqrt{5}$ - (4$\sqrt{5}$ -9) = -8$\sqrt{5}$

Hence, $a^2 - b^2$ = -18 (-8$\sqrt{5}$)

= 144$\sqrt{5}$

27. $5+2x$

We need to find the zero of the polynomial $5+2x$

$5+2x=0$

$\Rightarrow x=-\frac{5}{2}$

While applying the remainder theorem, we need to put the zero of the polynomial $5+2x$ in the polynomial x^3+3x^2+3x+1 ,to get

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

$p\left(-\frac{5}{2}\right)=\left(-\frac{5}{2}\right)^3+3\left(-\frac{5}{2}\right)^2+3\left(-\frac{5}{2}\right)+1$

$=-\frac{125}{8}+3\left(\frac{25}{4}\right)-\frac{15}{2}+1$

$=-\frac{125}{8}+\frac{75}{4}-\frac{15}{2}+1$

$=\frac{-125+150-60+8}{8}$

$=-\frac{27}{8}$.

28. a = 8 cm, b = 8 cm, c = 8 cm.

$s=\frac{a+b+c}{2}$

$\therefore\ \frac{8+8+8}{2}\mathrm{m}=12\,\mathrm{cm}$

∴ Area of the equilateral triangle

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

$= \sqrt{12(12-8)(12-8)(12-8)}$

$= \sqrt{12(4)(4)(4)}$

$= \sqrt{(4)(3)(4)(4)(4)}$

$= 16\sqrt{3}$ cm^2

Area = $\frac{1}{2}$ × Base × Altitude

$= 16\sqrt{3}$ = $\frac{1}{2}$ × 8 × Altitude

$= 16\sqrt{3}$ = 4 Altitude

Altitude $= \frac{16\sqrt{3}}{4} = 4\sqrt{3}$ cm.

OR

Perimeter = 84 cm.

Ratio of sides = 13 : 14 : 15

Sum of the ratios = 13 + 14 + 15 = 42

∴ One side (a) = $\frac{13}{42} \times$ 84 = 26 cm.

Second side (b) = $\frac{14}{42} \times$ 84 = 28 cm.

Third side (c) = $\frac{15}{42} \times$ 84 = 30 cm

∴ s = $\frac{a+b+c}{2}$

= $\frac{26+28+30}{2}$ = $\frac{84}{2}$ = 42 cm

∴ Area of the triangle

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

= $\sqrt{42(42-26)(42-28)(42-30)}$

= $\sqrt{42(16)(14)(12)}$

= $\sqrt{42(16)(14)(4 \times 3)}$

= (42)(4)(2) = 336 cm^2

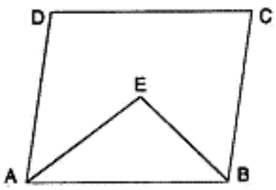
29. The value of c for which the linear equation 2x + cy = 8 has equal values of x and y i.e., x = y for its solution is

2x + cy = 8 ⇒ 2x + cx = 8 [∴ y = x]

⇒ cx = 8 - 2x

∴ $c = \frac{8-2x}{x}, x \neq 0$

30. Given: ABCD is a parallelogram. The angle bisectors AE and BE of adjacent angles A and B meet at E.



To Prove : ∠AEB = 90^o

Proof : AD || BC . . . [Opposite sides of || gm]

∴ ∠DAB + ∠CBA = 180^o . . .[As the sum of interior angles on the same side of a transversal is 180^o]

⇒ 2∠EAB + 2∠EBA = 180^o . . .[As AE and BE are the bisectors of ∠DAB and ∠CBA respectively]

⇒ ∠EAB + ∠EBA = 90^o

In △EAB,

∠EAB + ∠EBA + ∠AEB = 180^o . . .[As the sum of three angles of a triangle is 180^o]

⇒ 90^o + ∠AEB =180^o . . . [From (1)]

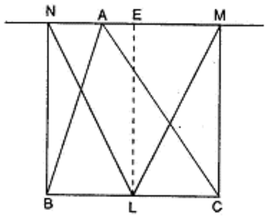
⇒ ∠AEB = 90^o

OR

Given: In △ABC, BN and CM are the perpendicular from B and C respectively on a line passing through the vertex A. L is the mid-point of BC.

To Prove : LM = LN.

Construction: Draw LE ⊥ MN.



Proof : BN || LE || CM and BC cuts them such that

BL = LC . . . . (1)

∴ ME = EN . . . [As MN cuts them] . . .(2)

In △LEM and △LEN,

ME = EN . . .[From (2)]

∠MEL = ∠NEL . . .[Each 90^o]

LE = LE . . .[Common side]

∴ △LEM ≅ △LEN . . . [By SAS axiom]

∴ LM = LN . . . . [c.p.c.t.]

31. y = x

We have, y = x

Let x = 1 : y = 1

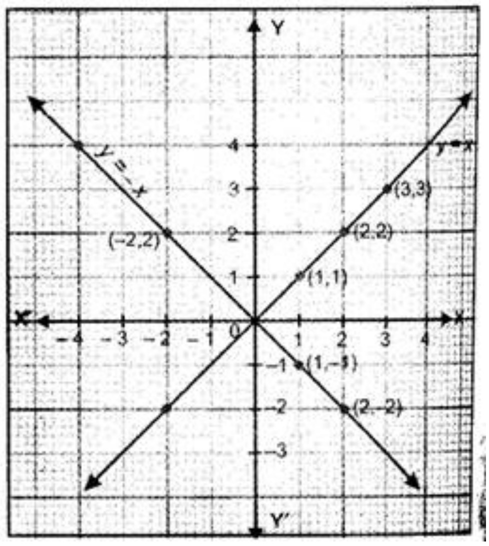
Let x = 2 : y = 2

Let x = 3 : y = 3

Thus, we have the following table :

x	1	2	3
y	1	2	3

By plotting the points (1, 1), (2, 2) and (3, 3) on the graph paper and joining them by a line, we obtain the graph of y = x.



y = -x

We have, y = -x

Let x = 1 : y = -1

Let x = 2 : y = -2

Let x = -2 : y = -(-2) = 2

Thus, we have the following table exhibiting the abscissa and ordinates of the points of the line represented by the equation y = -x.

x	1	2	-2
y	-1	-2	2

Now, plot the points (1, -1), (2, -2) and (-2, 2) and join them by a line to obtain the line represented by the equation y = -x.

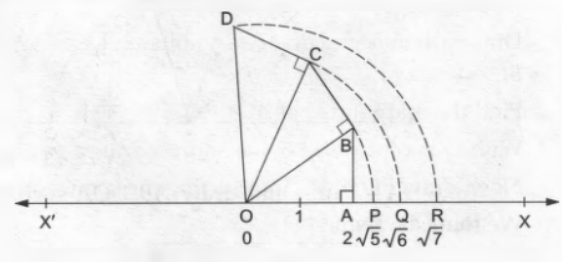
The graphs of the lines y = x and y = -x are shown in figure.

Two lines intersect at O (0, 0).

Section D

32. Draw a horizontal line X'OX, taken as the x-axis.

Take O as the origin to represent 0.



Let OA =2 units and let AB $\perp$OA such that AB = 1 unit

Join OB. Then, by Pythagoras Theorem

$OB = \sqrt{OA^2 + AB^2}$

$= \sqrt{2^2 + 1^2}$

$= \sqrt{5}$

With O as centre and OB as radius, draw an arc, meeting OX at P.

Then, OP = OB = $\sqrt{5}$

Thus, P represents $\sqrt{5}$ or the real line.

Now, draw BC $\perp$OB and set off BC = 1 unit.

Join OC. Then, by Pythagoras Theorem

$OC = \sqrt{OB^2 + BC^2} = \sqrt{(\sqrt{5})^2 + 1^2} = \sqrt{6}$

With O as centre and OC as radius, draw an arc, meeting OX at Q

Then, OQ = OC = $\sqrt{6}$

Thus, Q represents $\sqrt{6}$ on the real line.

Now, draw CD $\perp$ OC and set off CD = 1 unit.

Join OD. Then,by Pythagoras Theorem

$OD = \sqrt{OC^2 + CD^2} = \sqrt{(\sqrt{6})^2 + 1^2} = \sqrt{7}$

With O as centre and OD as radius, draw an arc, meeting OX at R. Then

OR = OD = $\sqrt{7}$

Thus, the points P, Q, R represent the real numbers $\sqrt{5}$, $\sqrt{6}$ and $\sqrt{7}$ respectively

OR

Given, $a = \frac{1}{7-4\sqrt{3}}$ and $b = \frac{1}{7+4\sqrt{3}}$,

Now, $a = \frac{1}{7-4\sqrt{3}} = \frac{1}{7-4\sqrt{3}} \times \frac{7+4\sqrt{3}}{7+4\sqrt{3}} = \frac{7+4\sqrt{3}}{7^2-(4\sqrt{3})^2}$

$= \frac{7+4\sqrt{3}}{49-16\times3} = \frac{7+4\sqrt{3}}{49-48}$

$\therefore a = \frac{1}{7-4\sqrt{3}} = 7 + 4\sqrt{3}$

Now, $b = \frac{1}{7+4\sqrt{3}} = \frac{1}{7+4\sqrt{3}} \times \frac{7-4\sqrt{3}}{7-4\sqrt{3}} = \frac{7-4\sqrt{3}}{7^2-(4\sqrt{3})^2}$

$= \frac{7-4\sqrt{3}}{49-16\times3} = \frac{7-4\sqrt{3}}{49-48}$

$\therefore b = \frac{1}{7+4\sqrt{3}} = 7 - 4\sqrt{3}$

$a + b = 7 + 4\sqrt{3} + 7 - 4\sqrt{3} = 14$

$ab = (7 + 4\sqrt{3})(7 - 4\sqrt{3})$

= 7^2 -$(4(\sqrt{3}))^2$

$= 49 - 16 \times 3 = 49 - 48$

$\Rightarrow$ ab = 1

Now, $a^2 + b^2 = (a + b)^2 - 2ab$

= $(14)^2$ - 2 $\times$1

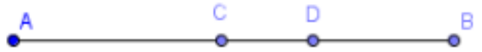
= 196 - 2

$\therefore a^2 + b^2 = 194$

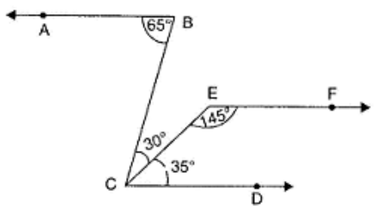
Also, $a^3 + b^3 = (a + b)^3 - 3ab(a + b)$

$= (14)^3 - 3 \times 1\ (14)$
= 2744 - 42
= 2702

33. We need to prove that every line segment has one and only one mid-point. Let us consider the given below line segment AB and assume that C and D are the mid-points of the line segment AB



If C is the mid-point of line segment AB, then
AC = CB.
An axiom of the Euclid says that “If equals are added to equals, the wholes are equal.”
AC + AC = CB + AC....(i)
From the figure, we can conclude that CB + AC will coincide with AB.
An axiom of the Euclid says that “Things which coincide with one another are equal to one another.” AC + AC = AB....(ii)
An axiom of the Euclid says that “Things which are equal to the same thing are equal to one another.”
Let us compare equations (i) and (ii), to get
AC + AC = AB, or 2AC = AB.(iii)
If D is the mid-point of line segment AB, then
AD = DB.
An axiom of the Euclid says that “If equals are added to equals, the wholes are equal.”
AD + AD = DB + AD....(iv)
From the figure, we can conclude that DB + AD will coincide with AB.
An axiom of the Euclid says that “Things which coincide with one another are equal to one another.”
AD + AD = AB....(v)
An axiom of the Euclid says that “Things which are equal to the same thing are equal to one another.”
Let us compare equations (iv) and (v), to get
AD + AD = AB, or
2AD = AB....(vi)
An axiom of the Euclid says that “Things which are equal to the same thing are equal to one another.” Let us compare equations (iii) and (vi), to get
2AC = 2AD.
An axiom of the Euclid says that “Things which are halves of the same things are equal to one another.” AC = AD.
Therefore, we can conclude that the assumption that we made previously is false and a line segment has one and only one mid-point.

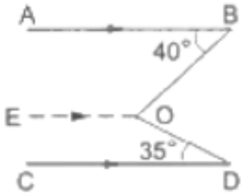
34. 

$\angle ABC = 65^o$
$\angle BCD = \angle BCE + \angle ECD = 30^o + 35^o = 65^o$
$\therefore \angle ABC = \angle BCD$
These angles form a pair of equal alternate angles
$\therefore$ AB || CD . . . (1)
$\angle FEC + \angle ECD = 145^o + 35^o = 180^o$
These angles are consecutive interior angles formed on the same side of the transversal.
$\therefore$ CD || EF . . . . (2)
AB || EF . . . [From (1) and (2)]

OR

Through O, draw EO $\parallel$ AB $\parallel$ CD
Then, $\angle EOB + \angle EOD = x^\circ$,
Now, AB $\parallel$ EO and BO is the transversal
$\therefore \angle ABO + \angle BOE = 180^\circ$ [consecutive interior angles]

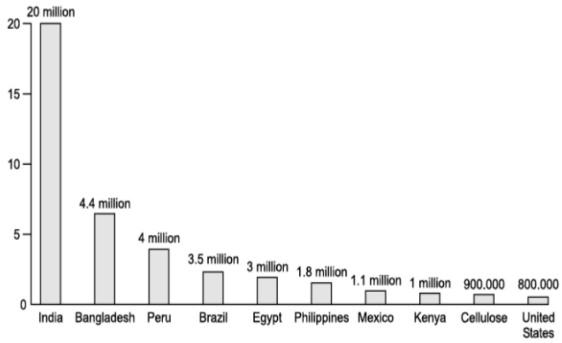
$\Rightarrow 40^{\circ} + \angle BOE = 180^{\circ}$
$\Rightarrow \angle BOE = (180^{\circ} - 40^{\circ}) = 140^{\circ}$
$\Rightarrow \angle$BOE =140°
Again CD $\|$ EO and OD is the transversal.
$\therefore \angle EOD + \angle ODC = 180^{\circ}$
$\Rightarrow \angle EOD + 35^{\circ} = 180^{\circ}$
$\Rightarrow \angle EOD = (180^{\circ} - 35^{\circ}) = 145^{\circ}$
$\Rightarrow \angle$EOD = 145°
$\therefore$ reflex $\angle BOD = x^{\circ} = (\angle BOE + \angle EOD)$
= (140° + 145°) = 285°
Hence, x° = 285°
$\Rightarrow \angle$BOD = x° = 285°



35. LHS is $x^3 + y^3 + z^3 - 3xyz$
and RHS is $\frac{1}{2}(x + y + z)\left[(x - y)^2 + (y - z)^2 + (z - x)^2\right]$.
We know that $x^3 + y^3 + z^3 - 3xyz = (x + y + z)\left(x^2 + y^2 + z^2 - xy - yz - zx\right)$ ....(i)
And also, we know that $(x - y)^2 = x^2 - 2xy + y^2$ ....(ii)
R.H.S. = $\frac{1}{2}(x + y + z)\left[(x - y)^2 + (y - z)^2 + (z - x)^2\right]$
$\frac{1}{2}(x + y + z)\left[\left(x^2 - 2xy + y^2\right) + \left(y^2 - 2yz + z^2\right) + \left(z^2 - 2xz + x^2\right)\right]$ [From eq.(i) and (ii)]
$\frac{1}{2}(x + y + z)\left(2x^2 + 2y^2 + 2z^2 - 2xy - 2yz - 2zx\right)$
$(x + y + z)\left(x^2 + y^2 + z^2 - xy - yz - zx\right)$.
Therefore, we can conclude that the desired result is verified

Section E

36. **Read the text carefully and answer the questions:**
Child labour refers to any work or activity that deprives children of their childhood. It is a violation of children's rights. This can them mentally or physically. It also exposes them to hazardous situations or stops them from going to school. Naman got data on the number of child labors (in million) in different country that is given below.



(i) The highest no child labor are in India and the lowest no child labor are in United states
No of child labor in India = 20,000,000
No of child labor in United states = 8,00,000
The difference = 20,000,000 - 8,00,000
= 19,200,000
(ii) No. of child labor in Peru = 4,000,000
No. of child labor in India = 20,00,000
The percentage = $\frac{4000000}{20000000} \times 100$ = 20%
(iii) The countries having child labor more than 2 million are
Egypt = 3 Million
Brazil = 3.5 million

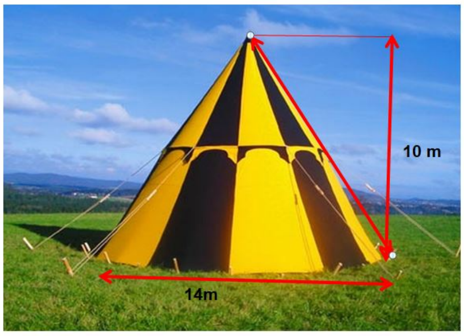
Peru = 4 million
Bangladesh = 4.4 million
India = 20 million
Total no of these labor child = 3 + 3.5 + 4 + 4.4 + 20 = 34.9 Million.

OR

The countries having child labor more than Mexico are:
Philippines = 1.8 Million
Egypt = 3 Million
Brazil = 3.5 million
Peru = 4 million
Bangladesh = 4.4 million
India = 20 million
Thus 6 countries are having child labor more than Mexico.

37. **Read the text carefully and answer the questions:**

Once four friends Rahul, Arun, Ajay and Vijay went for a picnic at a hill station. Due to peak season, they did not get a proper hotel in the city. The weather was fine so they decided to make a conical tent at a park. They were carrying 300 m² cloth with them. As shown in the figure they made the tent with height 10 m and diameter 14 m. The remaining cloth was used for the floor.



(i) Height of the tent h = 10 m
Radius r = 7 cm
Thus Latent height l = $\sqrt{r^2+h^2}$ = $\sqrt{7^2+10^2} = \sqrt{149}$ = 12.20 m
Curved surface of tent = $\pi rl = \frac{22}{7} \times 7 \times 12.2$ = 268.4 m^2
Thus the length of the cloth used in the tent = 268.4 m^2
The remaining cloth = 300 - 268.4 = 31.6 m^2
Hence the cloth used for the floor = 31.6 m^2

(ii) Height of the tent h = 10 m
Radius r = 7 cm
Thus the volume of the tent = $\frac{1}{3}\pi r^2 h$
= $\frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 10$
= 513.3 m^3

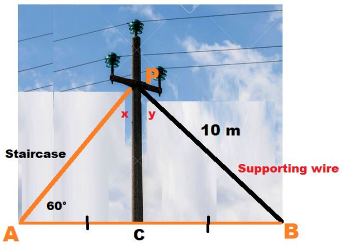
(iii) Radius of the floor = 7 m
Area of the floor = $\pi r^2 = \frac{22}{7} \times 7 \times 7$
= 154 m^2

OR

Radius of the floor r = 7 m
Latent height of the tent l = 12.2 m
Thus total surface area of the tent = $\pi r(r+l)$
= $\frac{22}{7} \times 7(7+12.2)$
= 22 $\times$ 19.2
= 422.4 m^2

38. **Read the text carefully and answer the questions:**

As shown In the village of Surya there was a big pole PC. This pole was tied with a strong wire of 10 m length.
Once there was a big spark on this pole, thus wires got damaged very badly. Any small fault was usually repaired with the help of a rope which normal board electricians were carrying on bicycles.
This time electricians need a staircase of 10 m so that it can reach at point P on the pole and this should make 60° with line AC.



(i) In $\triangle APC$ and $\triangle BPC$

$AP = BP$ (Given)

$CP = CP$ (common side)

$\angle ACP = \angle BCP = 90^o$

By RHS criteria $\triangle APC \cong \triangle BPC$

(ii) In $\triangle ACP$

$\angle APC + \angle PAC + \angle ACP = 180^o$

$\Rightarrow x + 60^o + 90^o = 180^o$ (angle sum property of $\triangle$)

$\Rightarrow \angle x = 180^o - 150^o = 30^o$

$\angle x = 30^o$

(iii) In $\triangle APC$ and $\triangle BPC$

Corresponding part of congruent triangle

$\angle PAC = \angle PBC$

$\Rightarrow \angle PBC = 60^o$ (given $\angle PAC = 60^o$)

OR

In $\triangle APC$ and $\triangle BPC$

Corresponding part of congruent triangle

$\angle X = \angle Y$

$\Rightarrow \angle Y = 30^o$ (given $\angle X = 30^o$)