N-E-P-S

Sub:- MATH

Class 8th

TERM:- 2nd

MENSURATION

Questions See book.

Exercise 10.1

Sol:- 1: Since, the perimeter of square & rectangle are same (given)

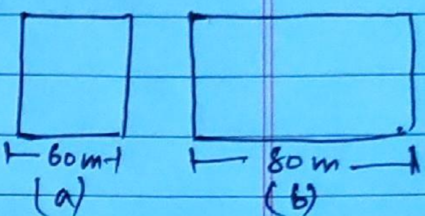
$\therefore$ Perimeter of square = Perimeter of rectangle

or $4 \times side = 2(length + breadth)$

or $4 \times 60 = 2(80 + breadth)$

or $240 = 2(80 + breadth)$

or $80 + breadth = \frac{240}{2} = 120$

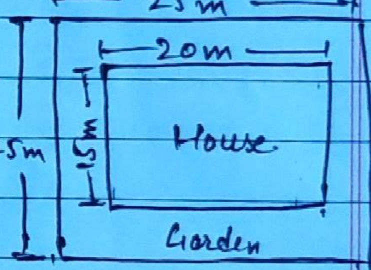


or Breadth $= 120 - 80 = 40m$

Now, Area of square $= (side)^2 = (60)^2 = 3600\ m^2$

& Area of rectangle $=$ length $\times$ breadth $= 60 \times 40 = 2400\ m^2$.

Thus, the square field has a larger area.



Sol 2: Given, side of sq. plot $= 25m$,

Area of sq. plot $= 25 \times 25 = 625\ m^2$

Length of house $= 20m$

and Breadth of house $= 15m$

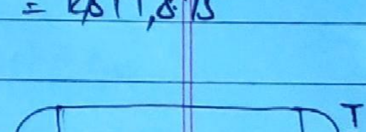
$\therefore$ Area of house $=$ length $\times$ breadth $= 20 \times 15 = 300\ m^2$

Area of garden $=$ Area of sq. plot $-$ Area of house

$= (625 - 300)\ m^2 = 325\ m^2$

Now, total cost of developing the garden $= 55 \times 325 =$ Rs 17,875

Sol 3 Given, Radius of semicircular end $= \frac{7}{2} = 3.5m$



Length of rectangle $=$ ~~20~~ $20 - (3.5 + 3.5)m = (20 - 7)m = 13m$.

and Breadth of rectangle $= 7m$

$\therefore$ Area of rectangle $=$ length $\times$ breadth $= 13 \times 7 = 91\ m$

Radius of semicircular portion $= 3.5m$

&

P2

$\therefore$ Area of semicircular portion $= \frac{1}{2}\pi r^2$

$= \frac{1}{2} \times \pi \times (3.5)^2$

$= \frac{1}{2} \times \frac{22}{7} \times \left[\frac{7}{2}\right]^2 = \frac{22}{2\times7} \times \frac{7\times7}{2\times2} = \frac{77}{4}\ m^2$

Now, Perimeter of semicircular portion,

$= \frac{2\pi r}{2} = \pi r = \frac{22}{7} \times 3.5 = \frac{22}{7} \times \frac{7}{2} = 11\ m^2$

Also, total area of garden = Area of rect. portion + 2×Area of semi circular portion

Area of garden $= 91 + 2 \times \frac{77}{4} = 91 + \frac{77}{2} = 91 + 38.5$

$= 129.5\ m^2$

Perimeter of garden = 2× length of rectangular section and:

$= 2 \times 13m + 2 \times 11m$

$= 26m + 22m = 48m.$

Sol 4: Area of 1 tile = base × height

$= 24 \times 10\ cm^2 = 240\ cm^2$

Area of floor $= 1080 m^2 = 1080 \times (100)^2\ cm^2$ (given)

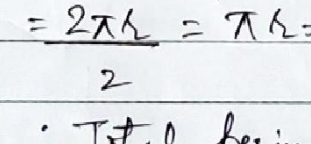
$= 10800000$ [$\because$ 1m = 100 cm, $1m^2 = 10000\ cm^2$]

No. of Tiles $= \frac{\text{Area of floor}}{\text{Area of 1 tile}} = \frac{10800000}{240} = 45000$

$\therefore$ 45,000 tiles are required.

Sol 5

(a)

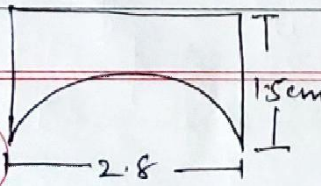


Since this is a semi circular portion, so circumference of the semicircular portion,

$= \frac{2\pi r}{2} = \pi r = \pi \times \frac{\cancel{2.8}^{1.4}}{\cancel{2}_{1}} = \frac{22}{7} \times \frac{14}{10} = 4.4\ cm$

$\therefore$ Total perimeter $= (2.8 + 4.4)\ cm = 7.2 cm$

(b)



Perimeter of given portion = Perimeter of three sides of rect + Perimeter of semi-circle

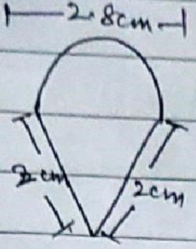
$= (l + 2b) + \frac{2\pi r}{2}$

$= (2.8+2\times1.5)+\pi r = (2.8+3)+\frac{22}{7}\times\frac{\cancel{2.8}^{1.4}}{\cancel{2}} = 5.8+\frac{22}{7}\times\frac{14}{10}$

$= 5.8+\frac{22}{5} = (5.8+4.4)$ cm

$= 10.2$ cm.

(c)



Perimeter of given portion
= Perimeter of side of triangle + Perimeter of semicircle

$= (2+2)\text{ cm} + \frac{2\pi r}{2} = 4+\frac{22}{7}\times\frac{\cancel{2.8}^{1.4}}{\cancel{2}}$

$= 4+\frac{22}{7}\times\frac{14}{10} = (4+4.4)$ cm

$= 8.4$ cm

∴ Ant would have to take longer round for food particle in (b)

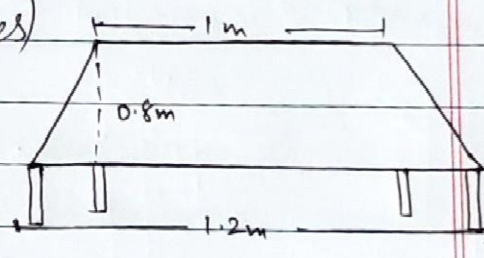
Exercise 10.2

Sol 1 Area of trapezium shaped table =

$\frac{1}{2}\times$ height $\times$ (sum of parallel sides)

$= \frac{1}{2}\times 0.8\times(1+1.2)$

$= \frac{1}{2}\times 0.8\times 2.2 = 0.88\text{m}^2$



Sol 2: Let other parallel side be x cm

∴ Area of trapezium $= \frac{1}{2}$ height × (sum of parallel sides)

$= 34 = \frac{1}{2}\times 4\times(10+x)$

$\Rightarrow 34 = 2(10+x)$

$\Rightarrow \frac{34}{2} = 10+x \Rightarrow 17 = 10+x$

$\Rightarrow x = 17-10 = 7$ cm

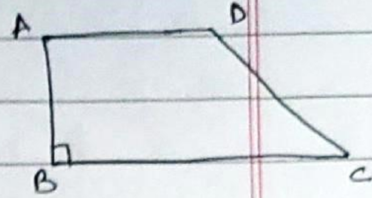
∴ The other parallel side is 7cm.

Sol 3: Perimeter of trapezium shaped field ABCD is given as,

$AB + BC + CD + DA = 120$

$AB + 48 + 17 + 40 = 120$

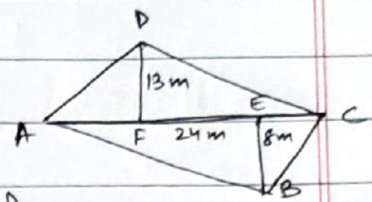
$AB = 120 - 105 = 15\ cm$



$\therefore$ Area of trapezium shaped field ABCD

$= \frac{1}{2} \times AB \times (AD + BC) = \frac{1}{2} \times 15 \times (48 + 40)$

$= \frac{1}{2} \times 15 \times 88 = 660 m^2$



Sol 4 Here, $AC = 24m$, $BE = 8m$, $DF = 13m$

$\therefore$ Area of quad. shaped field ABCD

$= \frac{1}{2} \times AC(BE + DF) = \frac{1}{2} \times 24 \times (8 + 13) = 12 \times 21 = 252 m^2$

Sol 5: Area of rhombus $= \frac{1}{2} \times$ product of diagonals

$= \frac{1}{2} \times 7.5 \times 12 = 45 m^2$

Sol 6 Since a Rhombus is also a parallelogm,

$\therefore$ Area of ||gm = Area of Rhombus

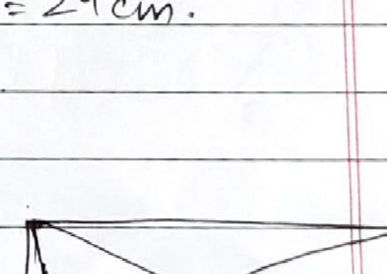
$\Rightarrow$ Base $\times$ Altitude = Area of rhombus.

Given, Base = 6 cm, attitude = 4 cm

$\therefore$ Area of Rhombus $= 6 \times 4 = 24$ cm.

Also, Area of Rhombus $= \frac{1}{2} d_1 \times d_2$

$\Rightarrow 24 = \frac{1}{2} \times 8 \times d_2$



$24 \times 2 = 8 \times d_2$.

$48 = 8 \times d_2$.

$\frac{48}{8} = d_2$

$\Rightarrow d_2 = 6\ cm$

Hence, the other diagonal is 6 cm.

Sol 7 Total no. of tiles = 3000

Area of 1 rhombus shaped tile $= \frac{1}{2} d_1 \times d_2$

$= \frac{1}{2} \times 45 \times 30 = 675 \text{ cm}^2$

Total floor area = No. of tiles × area of 1 tile

$3000 \times 675 = 2025000 \text{ cm}^2$

$= \frac{2025000}{10000} \text{ m}^2 = 205.5 \text{ m}^2$ $[\because 1 \text{cm}^2 = 10^{-4} \text{cm}^2]$

$\therefore$ Total cost of polishing floor $= 4 \times 202.5 =$ Rs 810.

Sol 8: Let length of side along road be x m. So, length of side along river be $2x$ m.

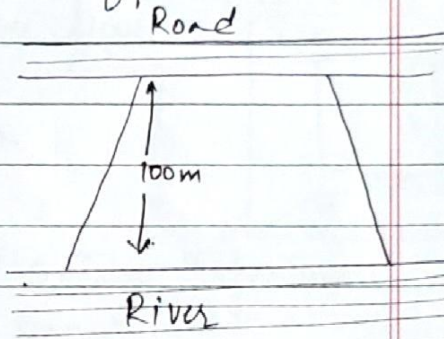
Area of trapezium shaped field $= \frac{1}{2} \times$ height $\times$ (sum of parallel sides)

$\Rightarrow 10500 = \frac{1}{2} \times$ height $\times$ (sum of parallel sides)

$\Rightarrow 10500 = \frac{1}{2} \times 100 \times (x + 2x)$

$\Rightarrow \frac{10500 \times 2}{100} = 3x \Rightarrow 210 = 3x$

$\Rightarrow x = \frac{210}{3} = 70 \text{ m}.$



$\therefore$ length of side along river $= 2x$

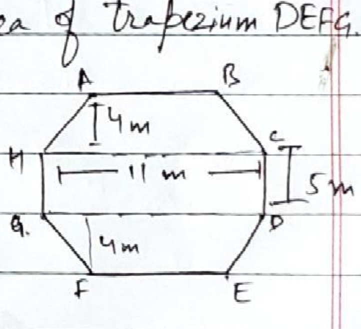
$= 2 \times 70 = 140$ m.

Sol 9: Area of octagon ABCDEFGH

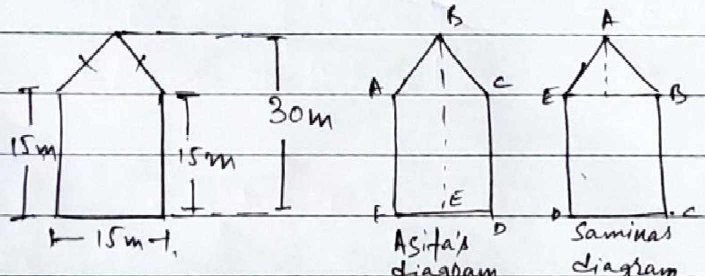
= Area of trapezium ABCH + Area of rect. CDGH + Area of trapezium DEFG.

$= \frac{1}{2} \times 4 \times (5 + 11) + (5 \times 11) + \frac{1}{2} \times 4 \times (5 + 11)$

$= 32 + 55 + 32 \text{ m}^2 = 119 \text{ m}^2$



Sol 10:

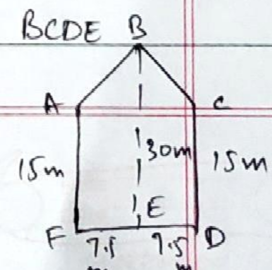


Asifa's diagram:

Area of park = Area of trapezium ABFE + Area of trapezium BCDE

$= \frac{1}{2} \times 7.5 (30 + 15) + \frac{1}{2} \times 7.5 \times (30 + 15)$

$= \frac{1}{2} \times 7.5 \times (45 + 45) = 337.5 \text{ m}^2$



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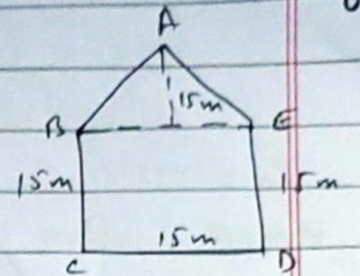
Samina's diagram:



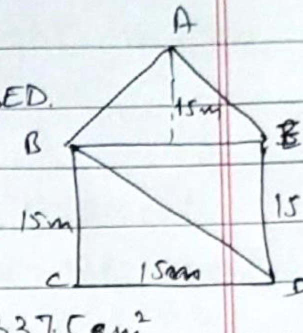
Area of park = Area of ΔABE + Area of Sq. BCDE

$= \frac{1}{2} \times 15 \times 15 + (15 \times 15)$

$= \frac{225}{2} + 225 = 225\left(1 + \frac{1}{2}\right)$

$= 225 \times \frac{3}{2} = 337.5\ m^2$

Area of park can also be calculated as:



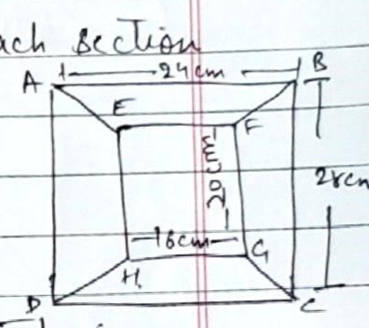
Area of park = Area of ΔABE + Area of ΔBCD + Area of ΔBED.

$= \frac{1}{2} \times BE \times AF + \frac{1}{2} \times CD \times BC + \frac{1}{2} \times BE \times DE$

$= \frac{1}{2} \times 15 \times 15 + \frac{1}{2} \times 15 \times 15 + \frac{1}{2} \times 15 \times 15$

$\Rightarrow 225/2 + 225/2 + 225/2 = \frac{225 + 225 + 225}{2} = 675/2 = 337.5\ m^2$

Sol 11: Let width of each section be 'x' cm. Each section of frame has a shape of trapezium. As per figure



$\Rightarrow \quad 24 = 16 + x + x$

$\Rightarrow \quad 24 - 16 = 2x$

$\Rightarrow \quad 2x = 8 \Rightarrow x = 4\,cm$

Two sections have same area, hence area of section trapezium

ABFE $= \frac{1}{2} \times 4 \times (16 + 24) = 2 \times 40 = 80\,cm^2$

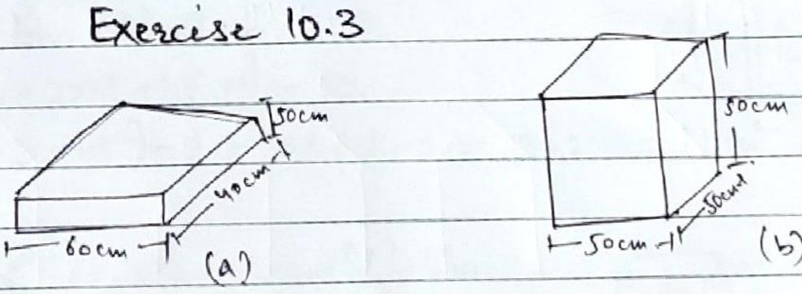
other second section (trap. CDHG) has the same area $= 80\,cm^2$

Area of trapezium BCGF $= \frac{1}{2} \times 4 \times (28 + 20) = 96\,cm^2$

Other section i.e Trapezium ADHE of frame has the same area $= 96\,cm^2$

Exercise 10.3

Sol 1



a) Total surface area of cuboidal box.

$= 2(lb + bh + hl) = 2(60 \times 40 + 40 \times 50 + 50 \times 60)$

$= 2(2400 + 2000 + 3000)$

$= 2 \times 7400\,cm^2 = 14800\,cm^2$

b) Total surface area of cuboidal box

$2(lb+bh+hl) = 2[50\times50+50\times50+50\times50]$

$= 2[2500+2500+2500] = 2\times7500\,cm^2 = 15000\,cm^2$

Thus, cuboidal box (a) requires least amount of material to make.

Sol 2: Given, length $l = 80cm$, Breadth $b = 48cm$, Height $h = 24cm$

$\therefore$ Total surface area of 1 surface $= 2(lb+bh+hl)$

$= 2(80\times48+48\times24+24\times80)$

$= 2(3840+1152+1920) = 2\times6912\,cm^2 = 13824\,cm^2$

and total surface area of 100 suitcases $= 13824\times100 = 1382400\,cm^2$

Width of the Tarpaulin $= 96cm$

$\therefore$ length of the Tarpaulin $= \frac{1382400cm}{96} = 14400\,cm$

$= \frac{14400}{100}\,m = 144\,m$

Sol 3: Given, surface area of cube $= 600\,cm^2$

Surface area of cube is $6l^2$

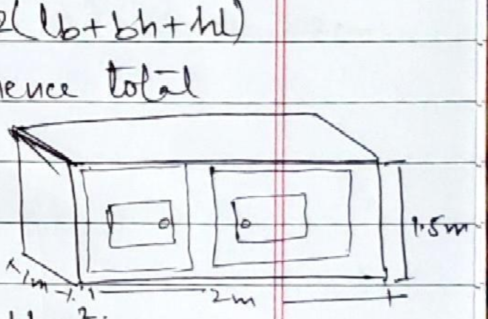
$\Rightarrow 600 = 6l^2$

$l^2 = 100 \Rightarrow l = 10\,cm$

Hence, side of cube is 10 cm.

Sol 4: Total surface area of cuboidal cabinet $= 2(lb+bh+hl)$

Since, the bottom of the box was not painted, hence total surface area of the cabinet painted



$2(lb+bh+hl) - l\times b$

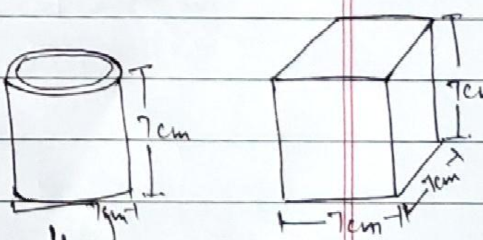
$= 2(1\times2+2\times1.5+1.5\times1) - 1\times2$

$= 2(2+3+1.5) - 2 = 2\times6.5-2 = 13-2 = 11\,m^2$

Sol 5 length of the class room $(l) = 15m$

Breadth of the class room $(b) = 10m$

Height of the class room $(h) = 7m$



$\therefore$ Total area to be painted $= lb\times2bh+2hl$ (excluding floor)

$= 150+140+210 = 500\,sq\,m$

Area covered by 1 can of paint $= 100\,m^2$

$\therefore$ Total no. of cans of paint $= \frac{500}{100} = 5$

Sol 6: Lateral surface area of cylindrical box $= 2\pi rh$
$= 2 \times \frac{22}{7} \times \frac{7}{2} \times 7 = 154\,cm^2$

Surface area of cubical box box $= 4l^2 = (4 \times (7)^2) = 4 \times 49 = 196\,cm^2$
Cubical box has more lateral surface area.

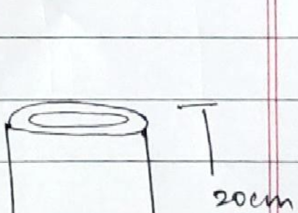
Sol 7: Radius of the cylindrical tank $(r) = 7m$
Height $(h) = 3m$
Total surface area of cylindrical tank $= 2\pi r(h+r)$
$= 2 \times \frac{22}{\cancel{7}} \times \cancel{7} \times (3+7) = 44 \times 10 = 440\,m^2$
Hence, the metal sheet required is $440\,m^2$

Sol 8: Lateral surface area of hollow cylinder $= 4224\,cm^2$
Height of cylinder $= 33\,cm$
Lateral surface area of cylinder $= 2\pi rh$
$\Rightarrow 4224 = 2\pi rh$
$\Rightarrow 4224 = 2\pi r \times 33$
$\Rightarrow 2\pi r = \frac{4224}{33} \Rightarrow 2\pi r = 128$

The circumference $(2\pi r)$ becomes the length of rectangular sheet.
$\therefore$ Perimeter of rect. sheet $= 2(l+b) = 2(128+33) = 2 \times 161 = 322\,cm$.

Sol 9: Height of the road roller $(l) = 1m$
Radius of the road roller $(r) = 84/2 = 42cm = 0.42\,cm$
Curved surface area of road roller $= 2\pi rl$.
$= 2 \times 22/7 \times 0.42 \times 1 = 44 \times 0.06 = 2.64\,m^2$
Area of the road covered in 1 revolution $= 2.64\,m^2$
Total area of road covered in 750 revolution
$= 2.64 \times 750 = 1980\,m^2$

Sol 10: For cylindrical container



diameter $= 16.8\,cm$; Radius $= 16.8/2 = 8.4\,cm$
Height $= 20.5\,cm$.
~~For~~ ~~labelled~~

For label:

Radius of the label (r) = 8.4 cm

Height of the label (h) = $20.5 - (2 \times 1.5) = 20.5 - 3.0 = 17.5$ cm

Total curved surface area of the label = $2\pi rh$

$= 2 \times 22/7 \times 8.4 \times 17.5 = 924\ cm^2$

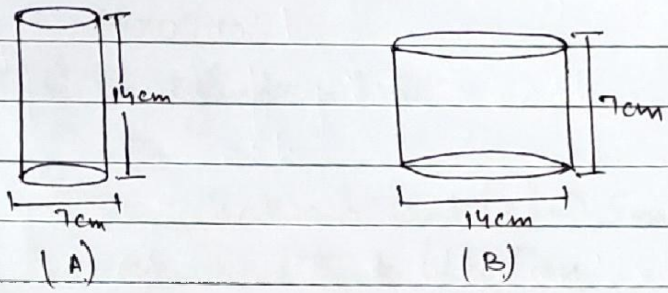
Exercise 10.4

Sol 1: (a) Vol. of cylinder = Area of base × Height

(b) No. of cement bags required to plaster it = Total surface area of cylinder = $2\pi r(r+h)$

(c) Volume cylinder = $\pi r^2 h$.

Sol 2 ~~For~~



For cylinder A:

Diameter (d) = 7 cm and height (h) = 14 cm

For cylinder B:

Diameter (d) = 14 cm, height = 7 cm.

Vol. of cylinder B is more b'coz it has larger radius [$\because$ Vol $\propto r^2$].

Total surface area of cylinder A = $2 \times 22/7 \times 7/2 \times 14 + 22/7 \times 7/2 \times 7/2$

$= 308\ cm^2 + 38.5 = 346.5\ cm^2$

Total surface area of cylinder B = $2\pi r(r+h)$

$= 2 \times 22/7 \times 7 \times (7+7) = 44 \times 14 = 616\ cm^2$

Yes, the cylinder with greater vol. has greater surface area.

Sol 3: Base area of cuboid = $180\ cm^2$

Vol. of the cuboid = $900\ cm^2$

Vol. of the cuboid = Area of the base × height

$900 = 180 \times h$

$h = \frac{900}{180} = 5$

$\therefore$ Height of cuboid is 5 cm.

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Sol 4: Vol. of the cuboid $= 64 \times 54 \times 30$ cm^3
$= 103680$ cm^3
Vol. of 1 small cube $= (side)^3 = 6^3 = 216$ cm^3
No. of small cubes = Vol. of cuboid / Vol. of 1 cube
$= 103680 / 216 = 480$

Sol 5: Vol. of cylinder $= 1.54$ m^3
Diameter of the base $= 140$ cm
Radius of the base $= 140/2 = 70$ cm $= 0.70$ m.
Let height of the cylinder be h m.
Now, Vol. of the cylinder $= \pi r^2 h$
$1.54 = 22/7 \times 0.7 \times 0.7 \times h$
$h = \frac{1.54 \times 7}{22 \times 0.7 \times 0.7}$ m $= 1$ m
Hence, height of the cylinder $= 1$ m.

Sol 6: Radius of the cylindrical tank $(r) = 1.5$ m
Length of the cylindrical tank $(l) = 7$ m
$\therefore$ Vol. of the tank $= \pi r^2 l = 22/7 \times 1.5 \times 1.5 \times 7$
$= 49.5$ $m^3 = 49.50 \times 100 \times 100 \times 100$ $cm^3 = 49500000$
$= 49500000/1000$ liters $= 49500$ liters [$\because 1000$ $cm^3 = 1$ liter]
Hence, the vol. of milk that can be in tank $= 49500$ liters.

Sol 7: Let each edge of the cube be x
Surface area of the cube $= 6x^2$; Volume of the cube $= x^3$
When each edge of the cube is $2x$, then, surface area of new cube $= 6(side)^2$
$= 6(2x)^2 = 6 \times 4x^2 = 24x^2$
Vol. of new cube $= (side)^3 = (2x)^3 = 8x^3$
i) $\frac{\text{Surface area of new cube}}{\text{Surface area of initial cube}} = \frac{24x^2}{6x^2} = 4.$
Surface area of new cube $= 4 \times$ (surface area of initial cube)
(ii) $\frac{\text{Vol. of new cube}}{\text{Vol. of initial cube}} = \frac{8x^3}{x^3} = 8$
$\therefore$ Vol of new cube $= 8 \times$ Vol. of initial cube.

Sol 8: Vol of reservoir $= 108 m^3$

Rate of filling water $= 60$ ltr/min $= 60 \times 60$ lt/hour.

$= 3600$ ltr/hr

1000 lt covers $1 m^3$ area

1 ltr covers $\frac{1}{1000} m^3$

3600 ltr covers $= \frac{1}{1000} \times 3600 = 3.6 m^3$

Time taken to fill tank $= \frac{\text{Vol. of reservoir}}{\text{Rate of filling}} = \frac{108}{3.6} = 30$ hour.

Factorization

Exercise 13.1

Q1 (i) $12x, 36$

$12x, 36$

Sol: $12x = 2 \times 2 \times 3 \times x$

$36 = 2 \times 2 \times 3 \times 3$

$\therefore$ HCF $= 2 \times 2 \times 3 = 12$

ii) $14pq, 28p^2q^2$

Sol: $14pq = 2 \times 7 \times p \times q$

$28p^2q^2 = 2 \times 2 \times 7 \times p \times p \times q \times q$

$\therefore$ HCF $= 2 \times 7 \times p \times q = 14pq$

iii) $6abc, 24ab^2, 12a^2b$.

Sol $6abc = 2 \times 3 \times a \times b \times c$

$24ab^2 = 2 \times 2 \times 2 \times 3 \times a \times b \times b$

$12a^2b = 2 \times 2 \times 3 \times a \times a \times b$

$\therefore$ HCF $= 2 \times 3 \times a \times b = 6ab$.

iv) $10pq, 20qr, 30rp$.

Sol $10pq = 2 \times 5 \times p \times q$

$20qr = 2 \times 2 \times 5 \times q \times r$

$30rp = 2 \times 3 \times 5 \times r \times p$

$\therefore$ HCF $= 2 \times 5 = 10$

Sol2

(i) $7x-42$

$7x-42 = 7(x-6)$

(ii) $7a^2+14a = 7a(a+2)$

(iii) $20l^2m+30alm = 10lm(2l+3a)$

(iv) $10a^2-15b^2+20c^2 = 5(2a^2-3b^2+4c^2)$

(v) $x^2yz+xy^2z+xyz^2 = xyz(x+y+z)$

(vi) $ax^2y+bxy^2+cxyz = xy(ax+by+cz)$

Sol3

(i) $x^2+xy+8x+8y = x(x+y)+8(x+y)$

$(x+y)(x+8)$

(ii) $15xy-6x+5y-2 = 3x(5y-2)+1(5y-2) = (5y-2)(3x+1)$

(iii) $ax+bx-ay-by = x(a+b)-y(a+b) = (x-y)(a+b)$

(iv) $z-7+7xy-xyz = 1(z-7)-xy(z-7) = (z-7)(1-xy)$

Exercise :- 13.2

Q1.(i) $a^2+8a+16$

Sol: $a^2+8a+16 = a^2+4a+4a+16 = a(a+4)+4(a+4) = (a+4)(a+4)$

(ii) $25m^2+30m+9 = 25m^2+15m+15m+9$

$= 5m(5m+3)+3(5m+3) = (5m+3)(5m+3)$

(iii) $4x^2-8x+4 = 4x^2-4x-4x+4 = 4x(x+1)-4(x-1)$

$= (x+1)(4x-4)$

(iv) $(l+m)^2-4lm = l^2+m^2+2lm-4lm = l^2-2lm+m^2$

$= l^2-lm-lm+m^2 = l(l-m)-m(l-m)$

$= (l-m)(l-m)$

(v) $a^4+2a^2b^2+b^4 = a^4+a^2b^2+a^2b^2+b^4$

$= a^2(a^2+b^2)+b^2(a^2+b^2) = (a^2+b^2)(a^2+b^2)$

Sol2. (i). $4p^2-9q^2 = (2p)^2-(3q)^2 = (2p+3q)(2p-3q)$
$[\because a^2-b^2=(a+b)(a-b)]$

(ii) $63a^2-112b^2 = 7(9a^2-16b^2) = 7[(3a)^2-(4b)^2]$
$= 7[(3a+4b)(3a-4b)] = 7(3a+4b)(3a-4b)$

(iii) $(l+m)^2(l-m)^2 = [\{(l+m)+(l-m)\}-\{(l+m)-(l-m)\}]$
$= \{(l+m+l-m)(l+m-l+m)\} = 2l\times 2m = 4lm$

(iv) $(x^2-2xy+y^2)-z^2 = (x-y)^2-z^2 = (x-y+z)(x-y-z)$
$[\because (x-y)^2 = x^2-2xy+y^2]$.

(v) $25a^2-4b^2+28bc-49c^2 = 25a^2-(4b^2-28bc+49c^2)$
$= (5a)^2-[(2b)^2-2\times 2b\times 7c+(7c)^2]$
$(5a)^2-(2b-7c)^2 = [(5a)+(2b-7c)][(5a)-(2b-7c)]$.
$= (5a+2b-7c)(5a-2b+7c)$

Sol3 (i) $ax^2+bx = x(ax+b)$
(ii) $2x^3+2xy^2+2xz^2 = 2x(x^2+y^2+z^2)$
(iii) $(lm+l)+m+1 = l(m+1)+1(m+1)$
(iv) $5y^2-20y-8z+2yz = 5y(y-4)+2z(y-4) = (y-4)(5y+2z)$
(v) $6xy-4y+6-9x = 2y(3x-2)-3(3x-2) = (3x-2)(2y-3)$

Sol 4: (i) $a^4-b^4 = (a^2-b^2)^2 = (a^2+b^2)(a^2-b^2)$
$= (a^2+b^2)[a^2-b^2] = (a^2+b^2)[(a+b)(a-b)]$
$= (a^2+b^2)(a+b)(a-b)$

(ii) $x^4-(y+z)^4 = (x^2)^2-[(y+z)^2]^2$
$[x^2+(y+z)^2][x^2-(y+z)^2]$
$= [x^2+(y+z)^2][x-(y+z)][x+(y+z)]$
$= (x-y-z)(x+y+z)[x^2+(y+z)^2]$

(iii) $a^4-2a^2b^2+b^4 = (a^2)^2-2a^2b^2-(b^2)^2 = (a^2-b^2)^2$
$= (a^2-b^2)(a^2-b^2)$
$= (a+b)(a-b)(a+b)(a-b) = (a+b)^2(a-b)^2$

Sol 5 (i) $p^2+6p+8 = p^2+2\times p\times 3+9-1 = p^2+2\times p\times 3+3^2-1$

$= (p-3)^2-1 \quad [\because a^2+2ab+b^2=(a+b)^2]$

$= (p+3)^2-(1)^2 \quad [\because a^2-b^2=(a+b)(a-b)]$

$= (p+3+1)(p+3-1) = (p+4)(p+2)$

(ii) $q^2-10q+21 = q^2-2\times q\times 5+5^2-4 = (q-5)^2-2^2$

$= (q-5+2)\times(q-5-2) = (q-3)(q-7)$

(iii) $p^2+6p-16 = p^2+2\times p\times 3+(3)^2-25 = (p+3)^2-5^2$

$= (p+3+5)(p+3-5) = (p+8)(p-2)$

Exercise 13.3

Sol 1: (i) $28x^4 \div 56x = \dfrac{28\times x\times x^3}{28\times 2\times x} = \dfrac{1}{2}x^3$

(ii) $66pq^2r^3 \div 11qr^2 = \dfrac{11\times 6\times p\times q\times q\times r\times r^2}{11\times q\times r^2} = 6pqr$

(iii) $34x^3y^3z^3 \div 51xy^2z^3 = \dfrac{2\times 17\times x\times x^2\times y\times y^2\times z^3}{3\times 17\times x\times y^2\times z^3} = \dfrac{2}{3}x^2y$

(iv) $12a^8b^8 \div (-6a^6b^4) = \dfrac{2\times 6\times a^2\times a^6\times b^4\times b^4}{-6\times a^4\times b^4} = -2a^2b^4$

Sol 2: (i) $(5x^2-6x)\div 3x = \dfrac{5x^2}{3x} - \dfrac{6x}{3x} = \dfrac{5x}{3} - 2 = \dfrac{1}{3}(5x-6)$

(ii) $8(x^3y^2z^2+x^2y^3z^2+x^2y^2z^3)\div 4x^2y^2z^2 =$

$\dfrac{8\times x\times x^2\times y^2\times z^2}{4\times x^2\times y^2\times z^2} + \dfrac{8\times x^2\times y\times y^2\times z^2}{4\times x^2\times y^2\times z^2} + \dfrac{8\times x^2\times y^2\times z\times z^2}{4\times x^2\times y^2\times z^2} = 2x+2y+2z$

$= 2(x+y+z)$

(iii) $(p^3q^6-p^6q^3)\div p^3q^3 = \dfrac{p^3\times q^3\times q^3}{p^3\times q^3} - \dfrac{p^3\times p^3\times q^3}{p^3\times q^3} = q^3-p^3$

Sol 3: (i) $(10x-25)\div 5 = \dfrac{5(2x-5)}{5} = 2x-5$

(ii) $(10x-25)\div(2x-5) = \dfrac{5(2x-5)}{2x-5} = 5$

(iii) $9x^2y^2(3z-24) \div 27xy(z-8) = \dfrac{9xy \times xy \times 3(z-8)}{3 \times 9xy(z-8)} = xy.$

(iv) $96abc(3a-12)(5b-30) \div 144(a-4)(b-6)$

$= \dfrac{16 \times 6 \times abc \times 3(a-4) \times (b-6)}{16 \times 9 \times (a-4) \times (b-6)} = 10abc$

Sol 4: (i) $5(2x-1)(3x+5) \div (2x+1) = \dfrac{5(2x+1)(3x+5)}{(2x+1)} = 5(3x+5)$

(ii) $26xy(x+5)(y-4) \div 13x(y-4) = \dfrac{26xy(x+5)(y-4)}{13x(y-4)} = \dfrac{2 \times 13 \times x \times y \times (x+5)(y-4)}{13 \times x \times (y-4)}$

$= 2 \times y \times (x+5) = 2y(x+5)$

(iii) $20(y+4)(y^2+5y+3) \div 5(y+4) = \dfrac{20(y+4)(y^2+5y+3)}{5(y+4)}$

$= \dfrac{4 \times 5 \times (y+4) \times (y^2+2y+3)}{5 \times (y+4)} = 4(y^2+2y+3)$

(iv) $x(x+1)(x+2)(x+3) \div x(x+1) = \dfrac{x(x+1)(x+2)(x+3)}{x(x+1)} = (x+2)(x+3)$

Sol 5: (i) $(y^2+7y+10) \div (y+5)$

$y^2+7y+10 = y^2+5y+2y+10 = y(y+5)+2(y+5) = (y+2)(y+5)$

$\Rightarrow y^2+7y+10 \div (y+5) = \dfrac{y^2+7y+10}{y+5} = \dfrac{(y+5)(y+2)}{(y+5)} = (y+2)$

(ii) $(5p^2-25p+20) \div (p-1)$

$5p^2-25p+20 = 5p^2-20p-5p+20 = 5p(p-4)-5(p-4)$

$= (p-4)(5p-5) = (p-4) \times 5(p-1) = 5(p-4)(p-1)$

$\Rightarrow (5p^2-25p+20) \div (p-1) = \dfrac{5p^2-25p+20}{p-1} = \dfrac{5(p-4)(p-1)}{p-1} = 5(p-4)$

(iii) $5pq(p^2-q^2) \div 2p(p+q) = \dfrac{5pq(p+q)(p-q)}{2p(p+q)} = \dfrac{5}{2}q(p-q)$

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(iv) $39y^3(50y^2-98) \div 26y^2(5y+7)$

$\Rightarrow 50y^2-98 = 2(25y^2-49) = 2[(5y)^2-(7)^2] = 2[(5y+7)(5y-7)]$

$\Rightarrow 39y^3(50y^2-98) \div 26y^2(5y+7) = \dfrac{39y^3(50y^2-98)}{26y^2(5y+7)}$

$= \dfrac{13\times3\times y^3\times2\times(5y+7)\times(5y-7)}{13\times2\times y^2(5y+7)} = 3y(5y-7)$

Exercise 13.4

Sol 1. $4(x-5) = 4x-5$

LHS $= 4(x-5) = 4x-20$

$\therefore 4(x-5) = 4x-20$

$\therefore$ LHS = RHS

Sol 2: $2x+3y = 5xy$

LHS $= 2x+3y$

$\therefore 2x+3y = 2x+3y$.

$\therefore$ [illegible]

[illegible]

Sol 3: $5y+2y+y-7y=0$

LHS $= 5y+2y+y-7y$

$= 7y-7y+y = y$

$\therefore 5y+2y+y-7y = y$

Sol 4 $(2x)^2+4(2x)+7 = 2x^2+8x+7$

LHS $= (2x)^2+4(2x)+7$

$= 4x^2+8x+7$

$\therefore (2x)^2+4(2x)+7 = 4x^2+8x+7$

Sol 5: $(3x+2)^2 = 3x^2+6x+4$

LHS $= (3x+2)^2 = (3x)^2+2\times3x\times2+2^2$

$= 9x^2+12x+4$

$\therefore (3x+2)^2 = 9x^2+12x+4$.

Sol 6 (a) if $x=-3$ Then,

$x^2+5x-4 = (-3)^2+5(-3)+4 = 15$

LHS $= x^2+5x+4$

$= (-3)^2+5(-3)+4 = 9-15+4 = -2$

$\therefore x^2+5x+4 = -2$.

(b) if $x=3$, then

$x^2-5x+4 = (-3)^2-5(-3)+4$

$= 9+15+4 = 28$

$\therefore x^2-5x+4 = 28$

(c) [illegible] if $x=3$, Then

$x^2+5x = (-3)^2+5(-3)$

$= 9$ [illegible] $15 = 24$

$\therefore x^2+5x = -6$

Sol 7 $(y-3)^2 = y^2-9$

LHS $= (y-3)^2 = y^2-2\times y\times3+3^2$

$= y^2-6y+9$

$\therefore (y-3)^2 = y^2-6y+9$

Sol 8: $(2a+3b)(a-b) = 2a^2-3b$.

LHS $= (2a+3b)(a-b)$

$= 2a^2-2ab+3ab-3b^2$

$= 2a^2+ab-3b^2$

$\therefore (2a+3b)(a-b) = 2a^2+ab-3b^2$

Sol 9 $(a-4)(a-2) = a^2 - 8$

LHS $= (a-4)(a-2)$

$= a^2 - 2a - 4a + 8 = a^2 - 6a - 8$

$\therefore (a-4)(a-2) = a^2 - 6a - 8$

Sol 10 $\frac{3x^2+1}{3x^2} = 1+1 = 2$

LHS $= \frac{3x^2+1}{3x^2} = \frac{3x^2}{3x^2} + \frac{1}{3x^2}$

$1 + \frac{1}{3x^2} \Rightarrow \frac{3x^2+1}{3x^2} = 1 + \frac{1}{3x^2}$

Sol 11 $\frac{3}{4x+3} = \frac{1}{4x}$

LHS $= \frac{3}{4x+3} = \frac{3}{4x+3}$

$\therefore \frac{3}{4x+3} = \frac{3}{4x+3}$

Sol 12 $\frac{7x+5}{5} = 7x$

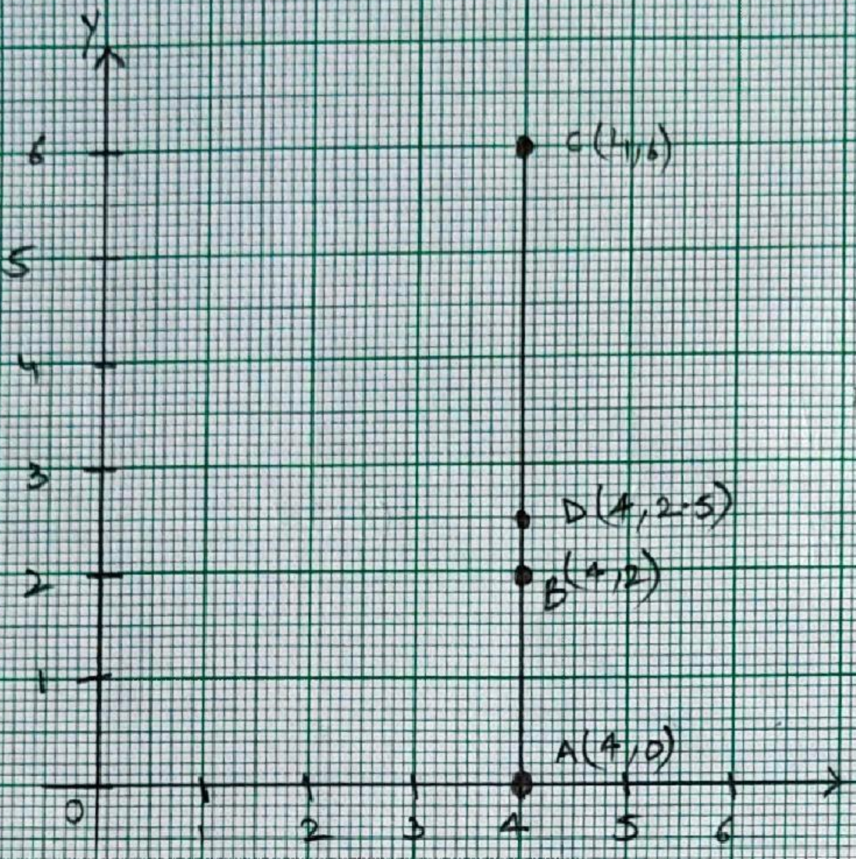
LHS $= \frac{7x+5}{5} = \frac{7x}{5} + \frac{5}{5}$

$= \frac{7x}{5} + 1 \Rightarrow \frac{7x+5}{5} = \frac{7x}{5} + 1$

Exercise 14.2

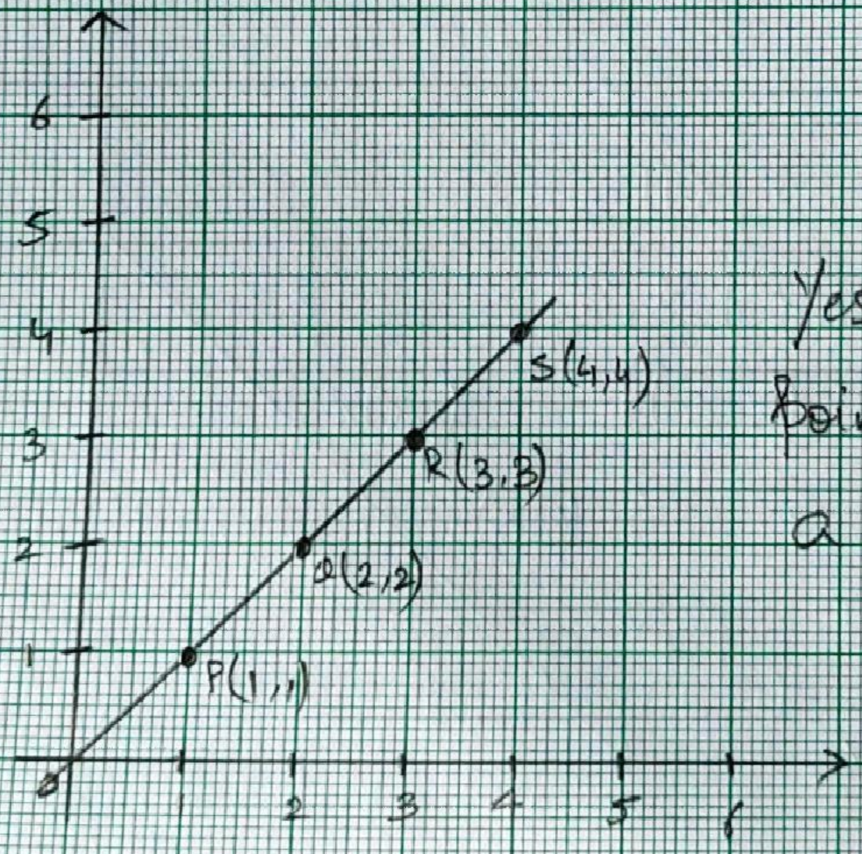
Q1

(i)



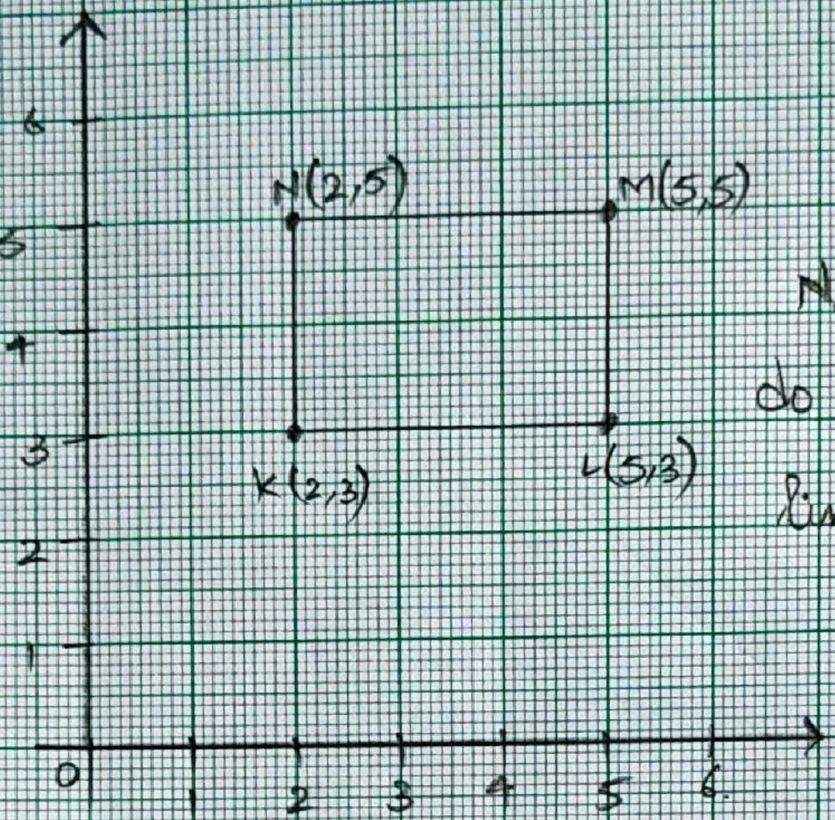
Yes, all the points lie on a line

(ii)



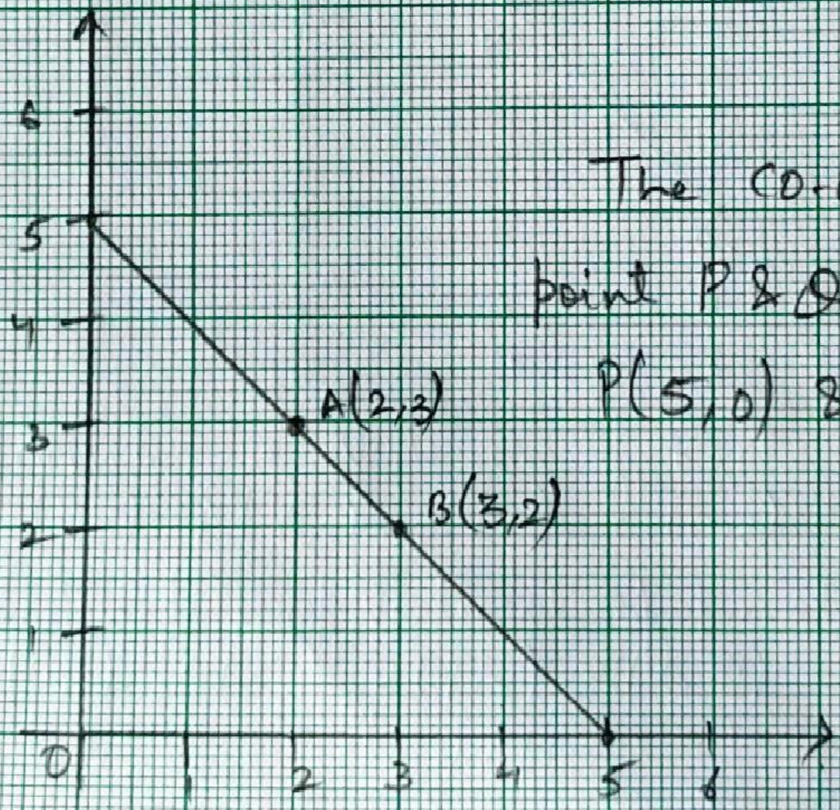
Yes, all the points lie on a line

(iii)



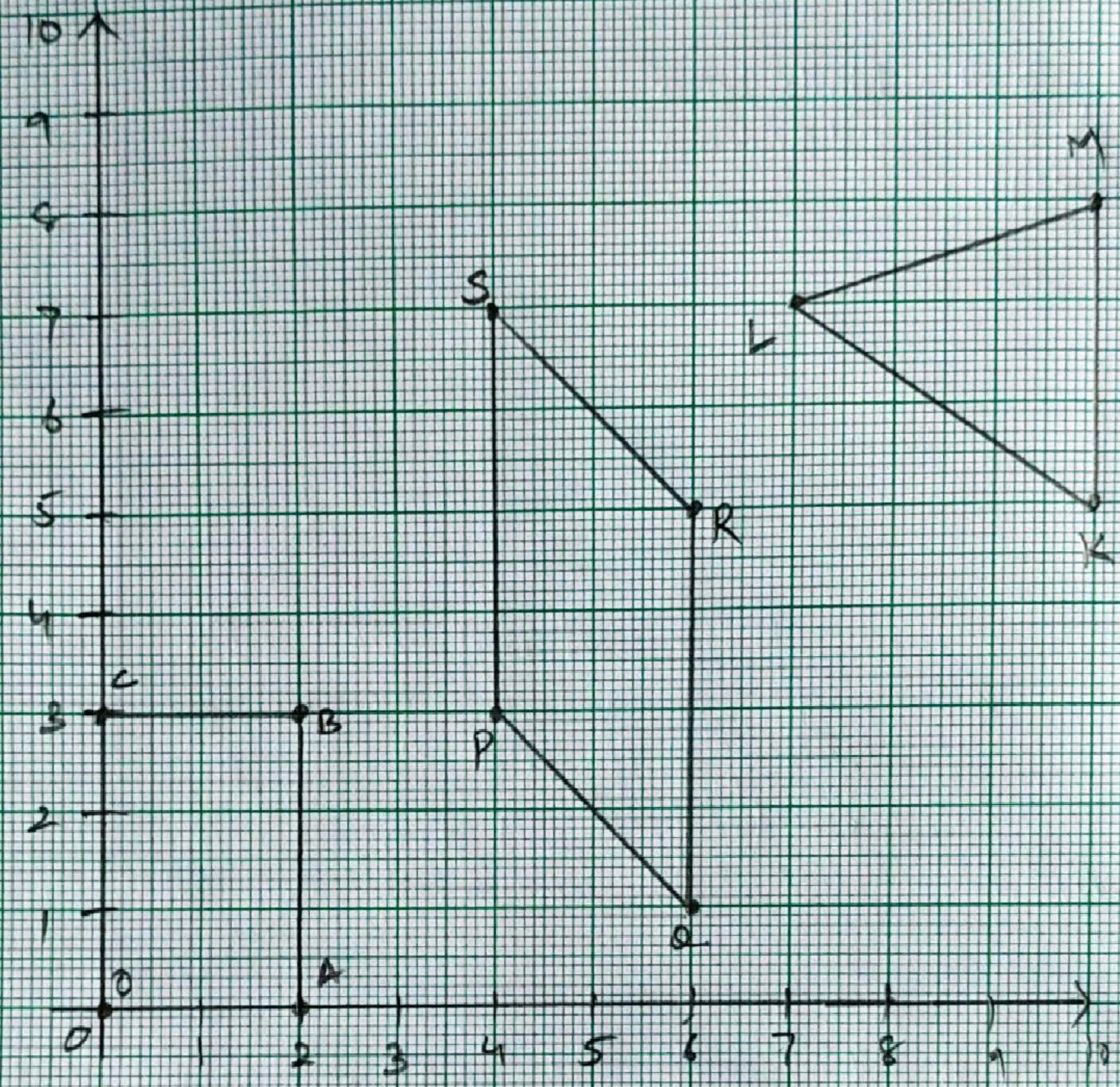
No, all points do not lie on a line.

Q2



The co-ordinates of point P & Q are P(5,0) & Q(0,5)

Q3



Coordinates of verticies of Rect
O(0,0), A(0,2), B(2,3), C(0,3)

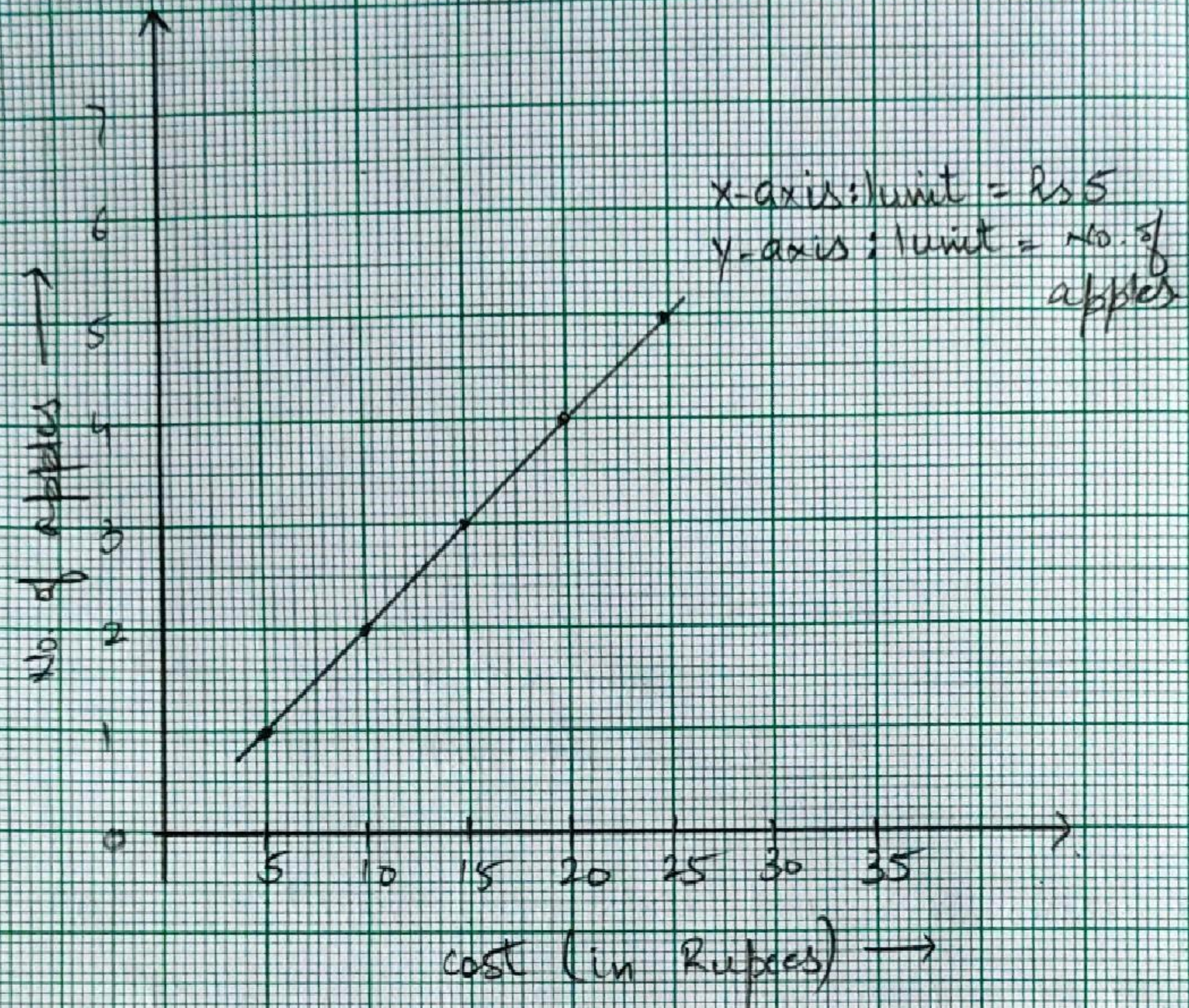
Coordinates of verticies of parallelogram
P(4,3), Q(6,1), R(6,5) S(4,7)

Coordinates of verticies of Triangle
L(7,7) K(10,5) M(10,8)

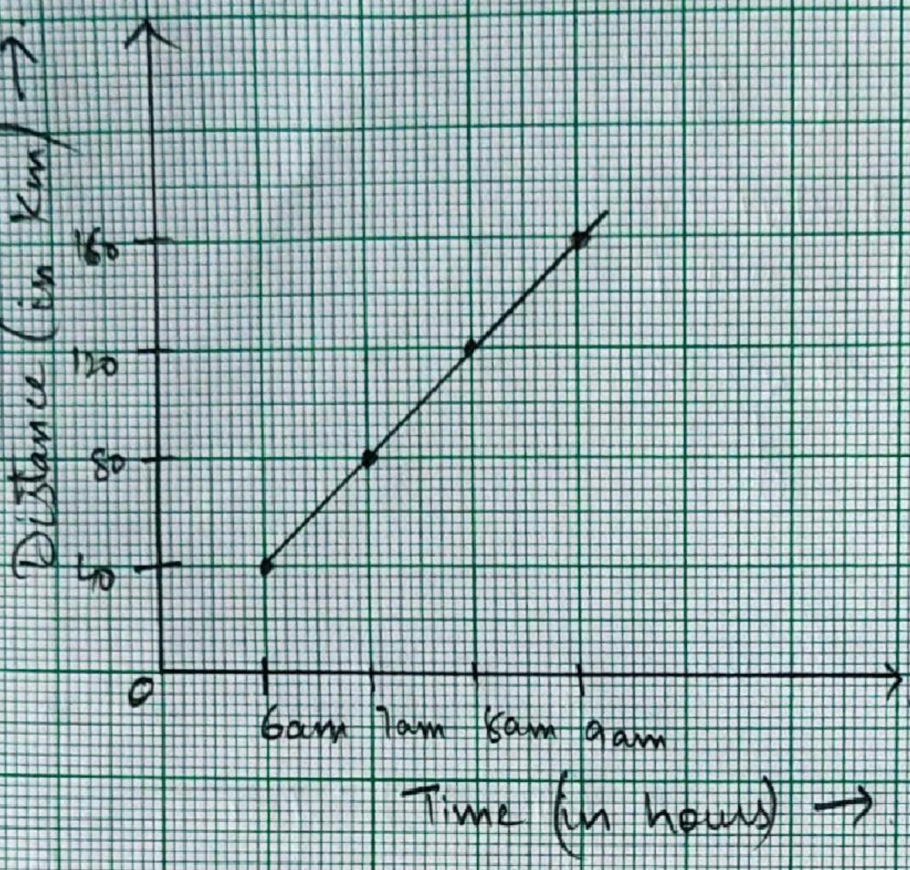
EXERCISE 14.3

Q1

(a)



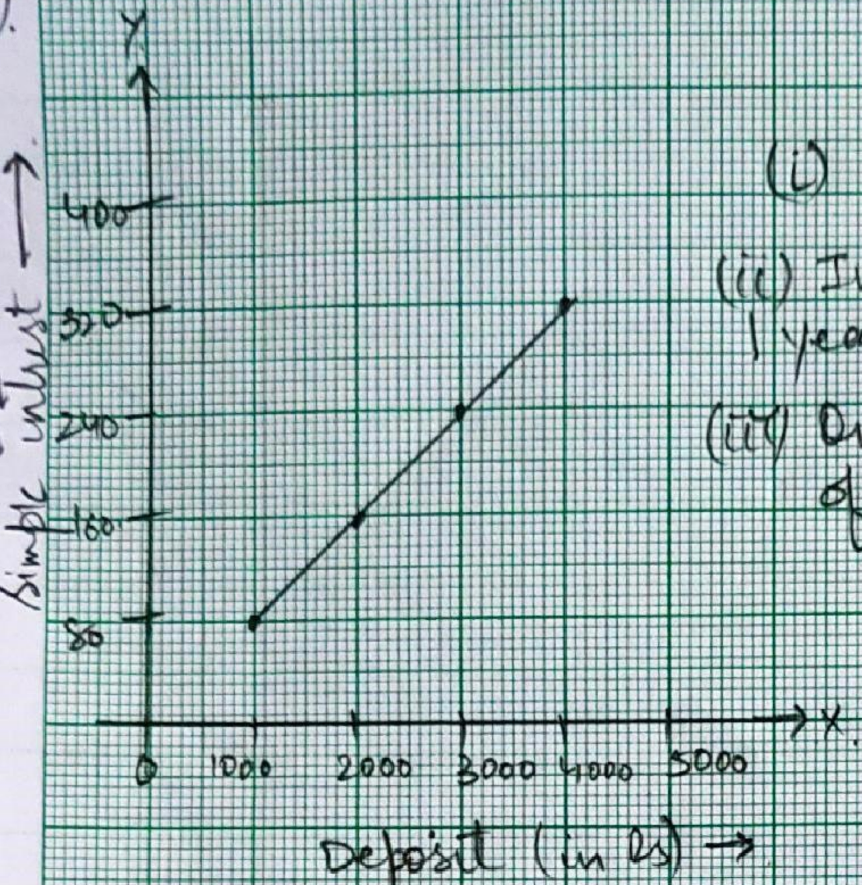
(b)



(i) Distance travelled by car during 7:30 am to 8 am = (120 − 100) = 20 km

(ii) At 7:30 am the car had covered a distance of 100 km.

(c).



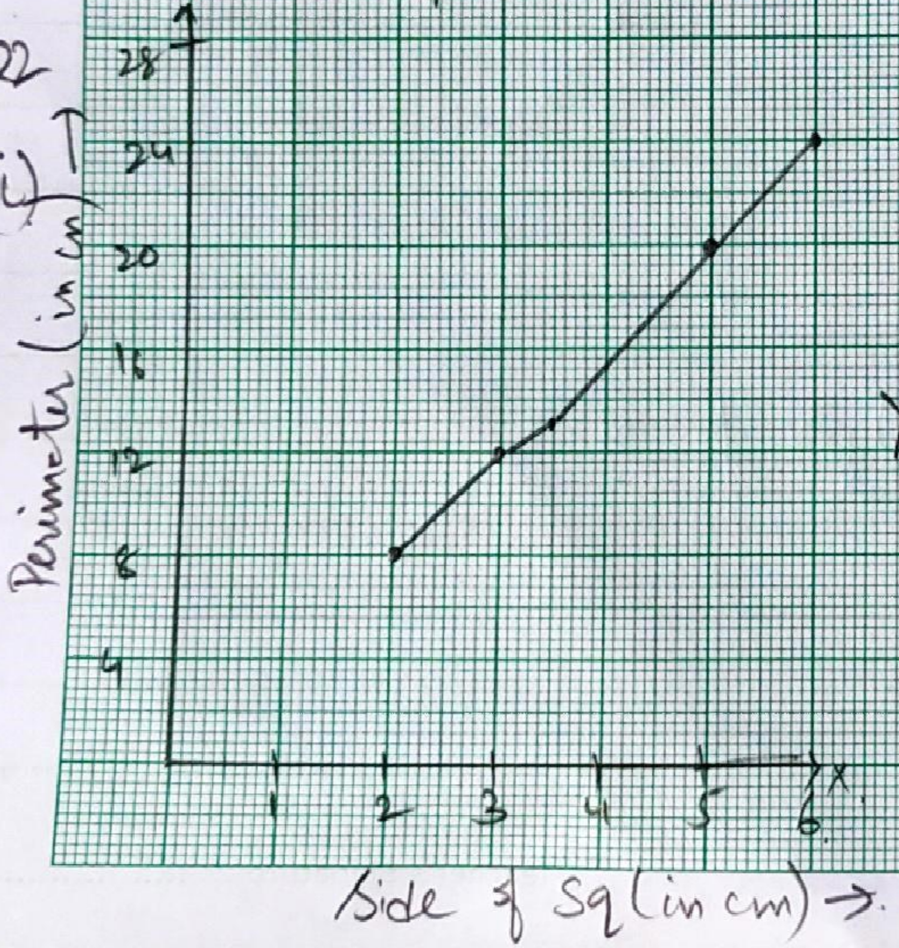
(i) Yes

(ii) Intrest on Rs 2500 for 1 year = Rs 200

(iii) On Rs 3500, intrest of 280 is obtained

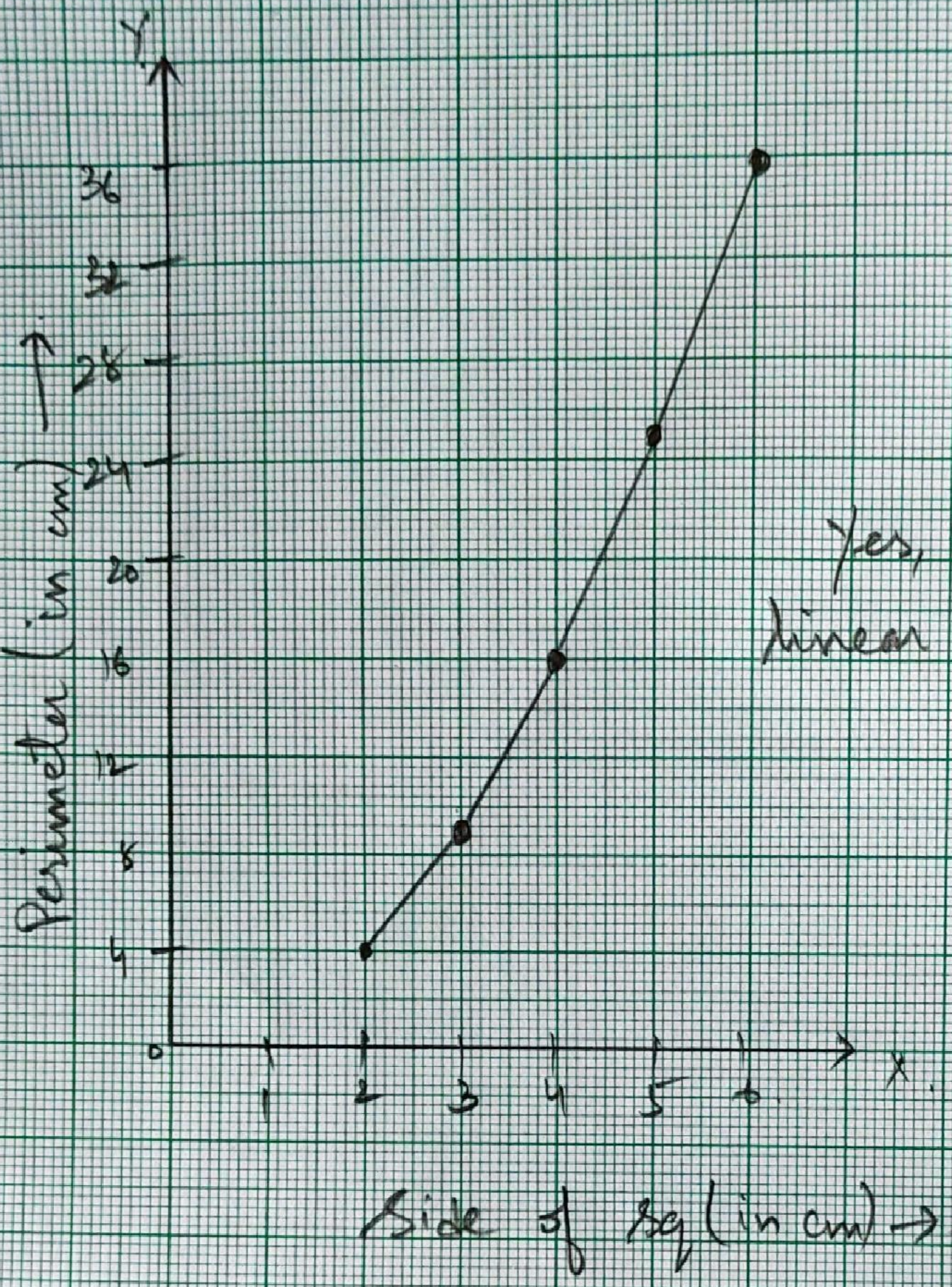
Q2

(i)



Yes, it is a linear graph

(ii)



Yes, it is a linear graph.