

10-16

Data Handling and Probability

* The collection of facts which are expressed numerically is called data.

* There are two kinds of data

- 1) Primary data
- 2) Secondary data

* There are three ^{types} of averages.

1] Mean [Arithmetic mean]

Mean = $\frac{\text{Sum of the observation}}{\text{Total number of observation}}$

2] Median: The median of a group of numbers is the number in the middle when the numbers arranged in an order.

3] Mode: The mode of the group of numbers is the number that appears most often.

* Range = Highest observation - lowest observation.

Ex - 16.1

1] Find the mode and median of the following data.

$$19 \times 11 = 209$$

$$\frac{19 \times 1}{2 \times 2} = 8$$

$$\frac{133}{66} = 8$$

$$10 = 11 \times 8$$

$$88 = 11 \times 8$$

$$42 = 11 \times 8$$

$$11 \times 8 = 88$$

$$140 = 8$$

$$\frac{133}{66} = 14$$

$$\frac{133}{66} = 14$$

$$\frac{133}{66} = 14$$

13, 16, 12, 14, 19, 12, 14, 13, 14

⇒ 13 - 2 times

16 - 1 time

12 - 2 times

14 - 3 times

19 - 1 times

⇒ Mode is 14

Arranging the observations in ascending order

12, 12, 13, 13, 14, 14, 14, 16, 19

Median is 14

2) Find the mean, median, mode and range of the following groups

a) 4, 6, 7, 6, 3, 6, 4, 2, 8, 6, 6, 2

⇒ * Mean

$$\text{Mean} = \frac{4+6+7+6+3+6+4+2+8+6+6+2}{12}$$

$$= \frac{59}{12}$$

$$\text{Mean} = 5$$

* Median Mode

2, 2, 3, 3 - 1 times

3 - 1 times

4 - 2 times

6 - 5 times

7 - 1 times

8 - 1 times

Mode is 6

* Median

2, 2, 3, 3, 4, 4, 6, 6, 6, 6, 7, 8

Median = $\frac{6+6}{2}$

$$= \frac{12}{2}$$

Median = 6

Range = 8 - 2

$$= 6$$

$$\begin{array}{r} 13 \\ - 34 \\ \hline 41 \end{array}$$

b) 57, 75, 40, 34, 45, 60, 45, 44

⇒ * Mean = $\frac{57+75+40+34+45+60+45+44}{8}$

$$= \frac{400}{8} = 50$$

* Median = 57 - 1 time

75 - 1 time

40 - 1 time

34 - 1 time

$$\begin{array}{r} 132 \\ + 40 \\ \hline 172 \\ 34 \\ \hline 206 \\ 75 \\ \hline 281 \\ 45 \\ \hline 326 \\ 44 \\ \hline 400 \end{array}$$

Mode is 45

Median = 34, 44, 45, 45, 57, 60, 75

= $\frac{45+45}{2}$

$$= \frac{90}{2} = 45$$

Range = 75 - 34

$$= 41$$

$$\begin{array}{r} 132 \\ + 40 \\ \hline 172 \\ 34 \\ \hline 206 \\ 75 \\ \hline 281 \\ 45 \\ \hline 326 \\ 44 \\ \hline 400 \end{array}$$

$$\begin{array}{r} 132 \\ + 40 \\ \hline 172 \\ 34 \\ \hline 206 \\ 75 \\ \hline 281 \\ 45 \\ \hline 326 \\ 44 \\ \hline 400 \end{array}$$

6) 32, 40, 23, 54, 35, 26, 23, 33, 38, 40

* Mean = $\frac{32+40+23+54+35+26+23+33+38+40}{10}$

= $\frac{350}{10}$

= 35

* Mode =

23 - 1 time

26 - 1 time

23 - 1 time

32 - 1 time

35 - 1 time

33 - 1 time

38 - 1 time

40 - 1 time

Mode is 40

* Median

23, 26, 29, 32, 33, 35, 38, 40, 40, 54

Median = $\frac{32+35}{2}$

= $\frac{67}{2}$

= 33.5

Range = $54 - 23$

= 31

3) Find the mode from the following frequency distribution.

Number	10	11	12	13	14	15	16	17
Frequency	6	7	8	15	18	9	10	12

Mode is 14.

A die was thrown 10 times and the following outcomes were recorded.

5, 1, 2, 5, 4, 3, 5, 6, 1, 6.

Prepare a frequency table and find the mean, mode, and median.

Outcome	Tally Marks	Frequency
1		2
2		1
3		1
4		1
5		3
6		2

* Mean = $\frac{5+1+2+5+4+3+5+6+1+6}{10}$

= $\frac{38}{10} = 3.8$

Mode is 5.

Median = $\frac{4+5}{2}$

= $\frac{9}{2} = 4.5$

- 5) The most popular car models used by the people of Delhi are given below. Find the mean.

Model	Maruti	Indica	Exora	Alto	Sum
No. of cars	80	60	15	45	10

$$\Rightarrow \text{Mean} = \frac{80 + 60 + 15 + 45 + 10}{5} = \frac{210}{5} = 42$$

- 6) Find the value of x if the mean of the following data is 9.
12, 5, 3, 18, 10, 17, x , 6, 6. Also, find the range of the data.

$$\Rightarrow \text{Mean} = \frac{\text{Sum of observation}}{\text{Num of observation}}$$

$$9 = \frac{12 + 5 + 3 + 18 + 10 + 17 + x + 6 + 6}{9}$$

$$9 = \frac{77 + x}{9}$$

$$9 \times 9 = 77 + x$$

$$81 = 77 + x$$

$$81 - 77 = x$$

$$4 = x$$

$$\text{Range} = 18 - 3 = 15$$

418
954
1972
424

- 7) For relief work, a family of 8 members contributed the following amounts (in ₹) of money.
200, 500, 350, 500, 250, 100, 320, 1004

Find the mode and mean contribution per member.

$$\Rightarrow * \text{ Mode is } 500$$

$$* \text{ Mean} = \frac{200 + 500 + 350 + 500 + 250 + 100 + 320 + 1004}{8} = \frac{3820}{8} = 477.5$$

$$= \frac{478}{2} = 239$$

$$\text{Ex: 16.2}$$

- 1) Read the graph and answer the following questions.

- a) Give a suitable title to the bar graph.
Expenditure on education of 4 countries.
Expenditure the maximum
b) In which region is the expenditure in 1990?
Australia.
c) In which region has the expenditure gone up from 1990 to 2000?
East African and Latin American.

c) 32, 40, 29, 54, 35, 26, 23, 33, 38, 40
 $\Rightarrow$ * Mean = $\frac{32+40+29+54+35+26+23+33+38+40}{10}$
 $= \frac{350}{10}$
 $= 35$

* Mode = 38 - 1 time
 23 - 1 time
 26 - 1 time
 29 - 1 time
 32 - 1 time
 35 - 1 time
 33 - 1 time
 Mode is 40

* Median
 23, 26, 29, 32, 33, 35, 38, 40, 40, 54
 Median = $\frac{33+35}{2}$
 $= \frac{68}{2}$
 $= 34$

Range = $54 - 23$
 $= 31$

3) Find the mode from the following frequency distribution.

Number	10	11	12	13	14	15	16	17
Frequency	6	7	8	15	18	9	10	12

$\Rightarrow$ Mode is 14.

4) A dice was thrown 10 times and the following outcomes were recorded.
 5, 1, 2, 5, 4, 3, 5, 6, 1, 6
 Prepare a frequency table and find the mean, mode, and median.

Outcome	Tally Marks	Frequency
1		2
2		1
3		1
4		1
5		3
6		2

* Mean = $\frac{5+1+2+5+4+3+5+6+1+6}{10}$
 $= \frac{38}{10}$
 $= 3.8$

* Mode is 5

* Median = $\frac{4+5}{2}$
 $= \frac{9}{2}$
 $= 4.5$

- 5) The most popular car models used by the people of Delhi are given below. Find the mean.

Model	Maruti	Indica	Exora	Alto	Genio
No. of cars	60	60	15	45	10

$$\begin{aligned} \text{Mean} &= \frac{60 + 60 + 15 + 45 + 10}{5} \\ &= \frac{190}{5} = 38 \end{aligned}$$

- 6) Find the value of x if the mean of the following data is 9.
12, 5, 3, 18, 10, 17, x , 6, 6. Also, find the range of the data.

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{Num. of observations}}$$

$$9 = \frac{12 + 5 + 3 + 18 + 10 + 17 + x + 6 + 6}{9}$$

$$9 = \frac{77 + x}{9}$$

$$9 \times 9 = 77 + x$$

$$81 = 77 + x$$

$$81 - 77 = x$$

$$4 = x$$

$$\begin{aligned} \text{Range} &= 18 - 3 \\ &= 15 \end{aligned}$$

- 7) For relief work, a family of 8 members contributed the following amounts (in ₹) of money.

200, 500, 350, 500, 250, 100, 300, 1004

Find the mode and mean contribution per member.

$$\Rightarrow \text{Mode is } 500$$

$$\begin{aligned} \text{Mean} &= \frac{200 + 500 + 350 + 500 + 250 + 100 + 300 + 1004}{8} \\ &= \frac{3204}{8} \\ &= 400.5 \end{aligned}$$

$$= \frac{478}{1} = 478$$

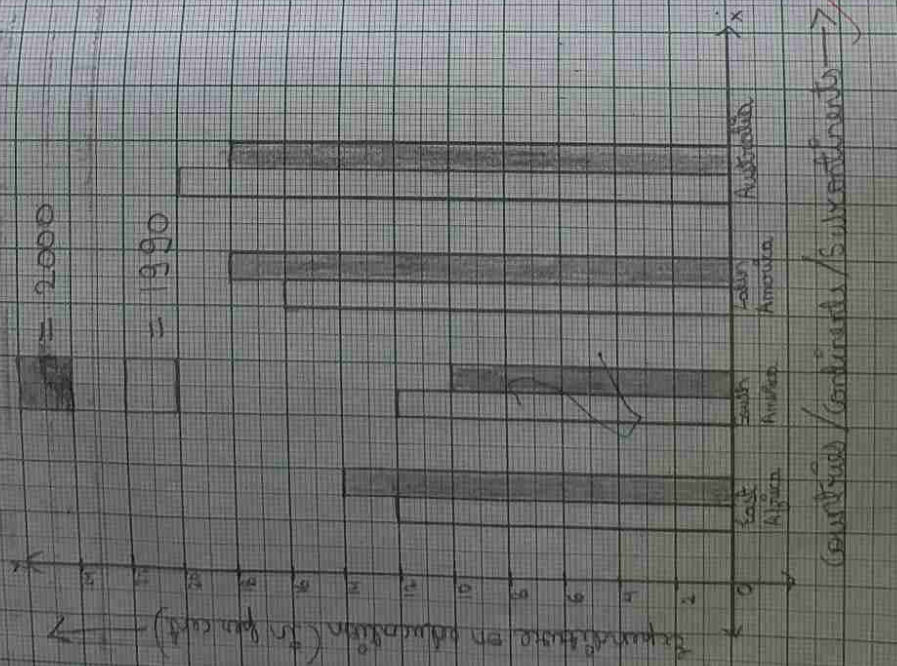
Ex 16.1

- 1) Read the graph and answer the following questions.

- Give a suitable title to the bar graph.
- Expenditure on education of 4 countries.
- In which region is the expenditure on education in 1990?
- Australia.
- In which region has the expenditure gone up from 1980 to 2000?
- East Africa and Latin America.

= 2000

= 1990



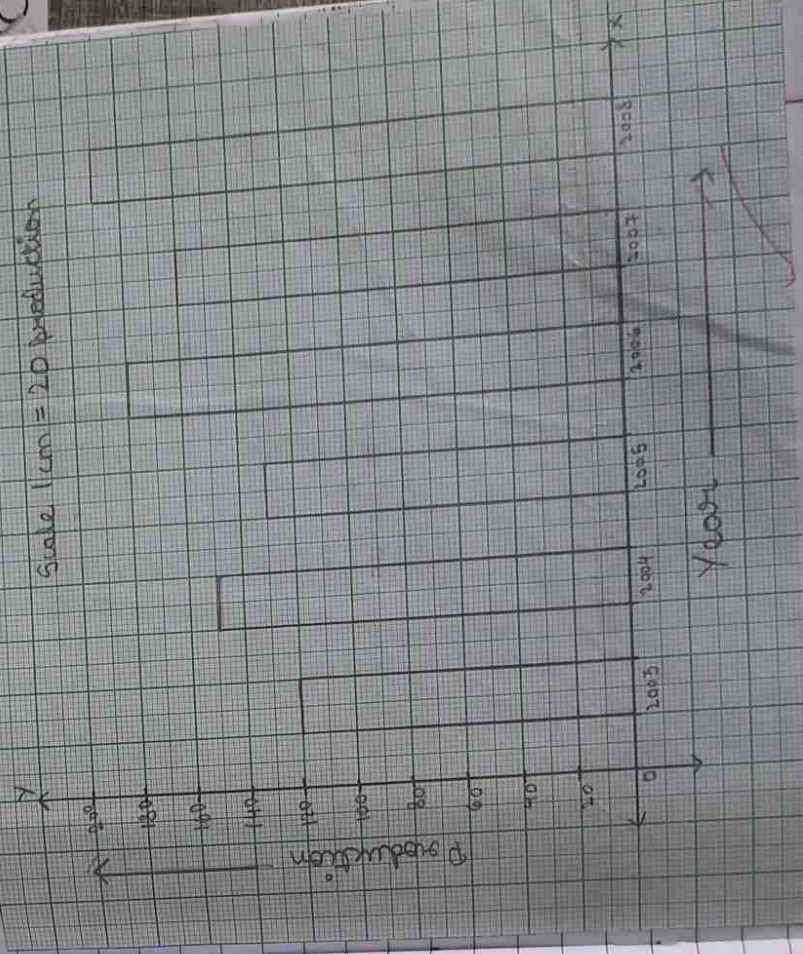
(countries/continents/continents) →

- 2) The following data gives the production of food grains (in thousand tonnes) for some years.

Year	2003	2004	2005	2006	2007	2008
Production (in 1000 tonnes)	120	150	130	180	160	190

Draw a bar graph for the above data.

Scale 1 cm = 20 production

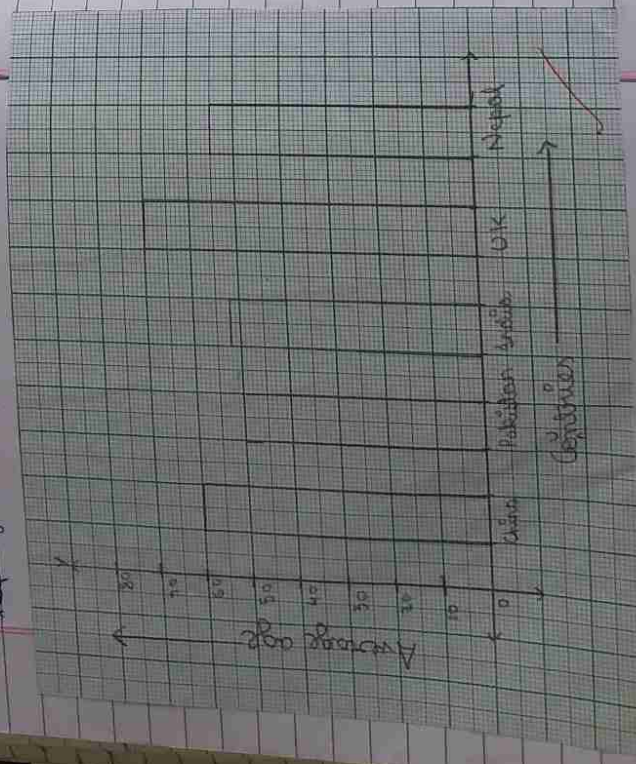


Year →

3) The following data shows the average age of men in various countries

Country	China	Pakistan	India	U.K	Nepal
Average age (in year)	50	52	40	55	55

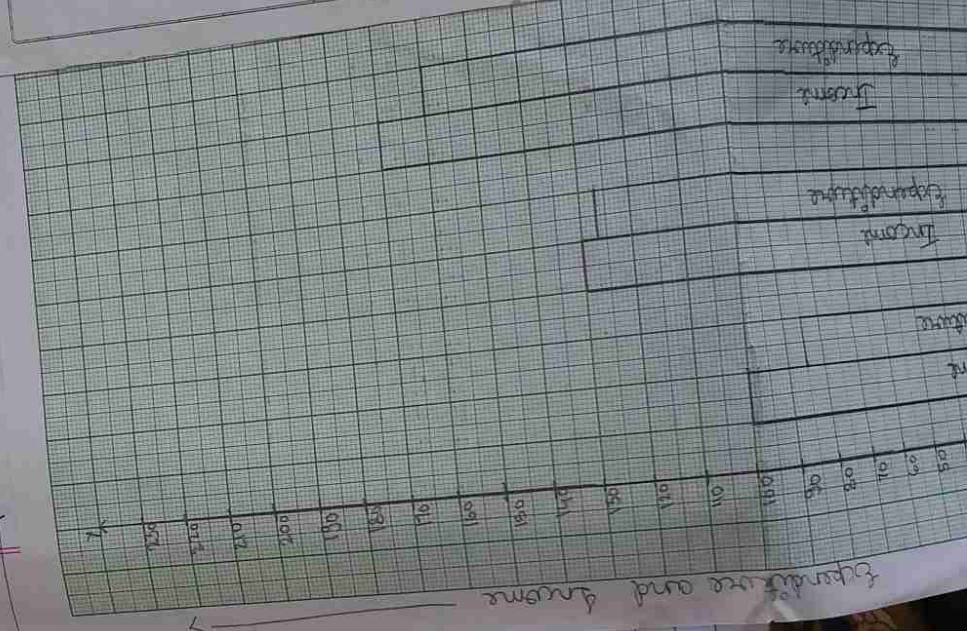
Represent the above information with the help of a bar graph.



4) The income and expenditure of a family for 5 years are given below

Year	2003-04	2004-05	2005-06	2006-07	2007-08
Income (in 1000)	100	130	170	185	210
Expenditure (in 1000)	85	127	160	170	190

Represent the above data with the help of a graph.



16/12/24

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Date

he - 14 - Construction

I Introduction

* Construction of parallel lines :-
when extended indefinitely in both direction, then such lines are called parallel lines.

1. Parallel lines are equidistant everywhere.
2. when two parallel lines are intersected by a transversal, then the corresponding angles and alternate interior angles formed are equal.
3. when two lines are intersected by a transversal, and the alternate interior angle or corresponding angles are equal then the lines are parallel.

Exmp 1:- Construct a line parallel to a given line AB and passing through a given point P outside the line AB.

Step 1:- Draw a line AB using a scale.



Step 2:- Mark a point P outside the line AB anywhere in the plane.



Step 3:- Take a point Q on the line AB and join PQ.



Step 4:- At P, draw $\angle CPQ = \angle PQB$ such that $\angle CPQ = \angle PQB$.



Step 5:- Extend CP to D to get line CD.



Example:- AB = 7cm. Draw a line CD.



Exercise 14.1

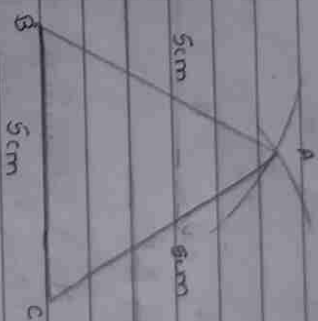
- Q1) Draw a line segment $XY = 7\text{cm}$. Take a point P outside XY . Draw a line parallel to XY and passing through P . Find the distance between the parallel lines.



- Q2) Draw a line segment $AB = 5.5\text{cm}$. Take a point P below AB and draw a line parallel to AB and passing through P .

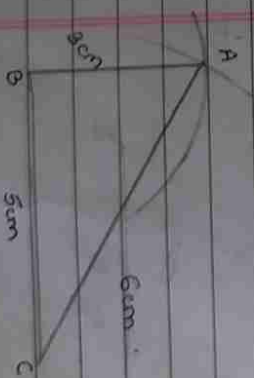


- Q3) Following triangle is an equilateral triangle with a side 5cm .

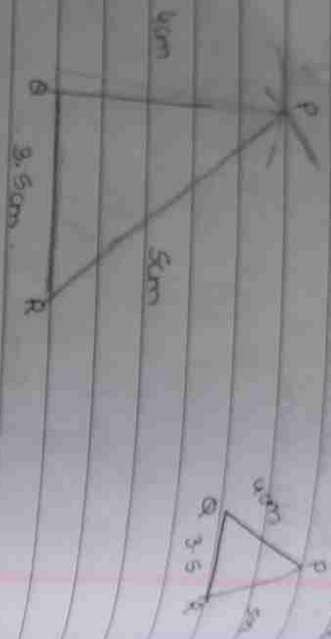


$$\frac{5}{5} \triangle$$

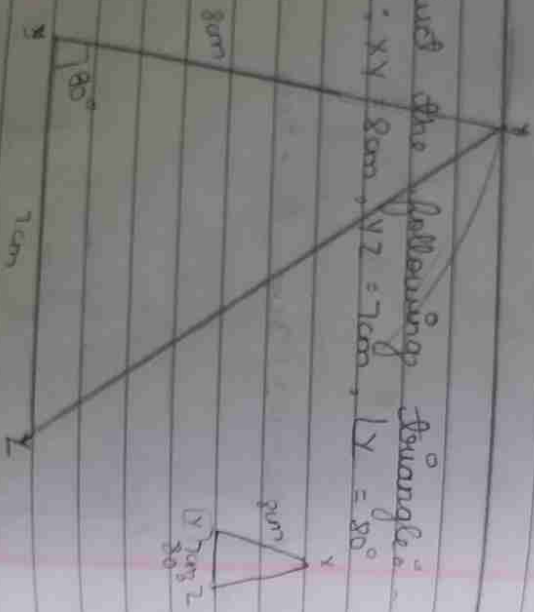
- Q4) $\triangle ABC$; $AB = 3\text{cm}$, $BC = 5\text{cm}$, $CA = 6\text{cm}$.



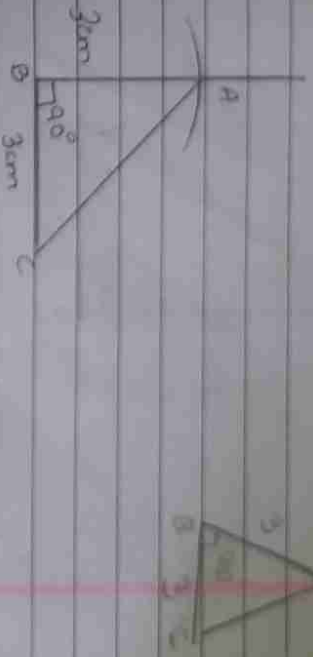
- Q] Construct $\triangle PQR$: $PQ = 4\text{ cm}$, $QR = 3.5\text{ cm}$, $\angle Q = 50^\circ$



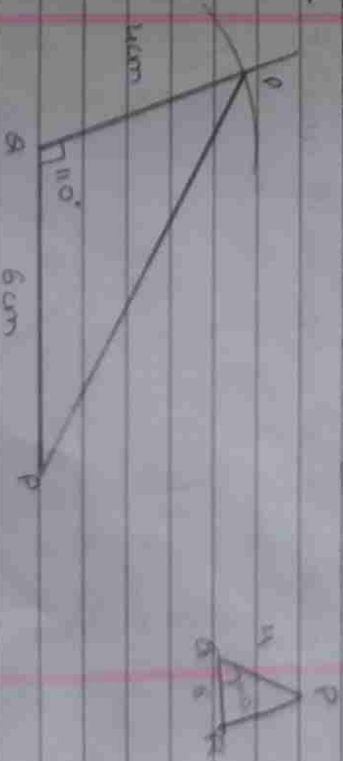
- Q] Construct the following triangle:
a] $\triangle XYZ$: $XY = 8\text{ cm}$, $YZ = 7\text{ cm}$, $\angle Y = 80^\circ$



- Q] Construct $\triangle ABC$: $AB = BC = 3\text{ cm}$, $\angle B = 90^\circ$

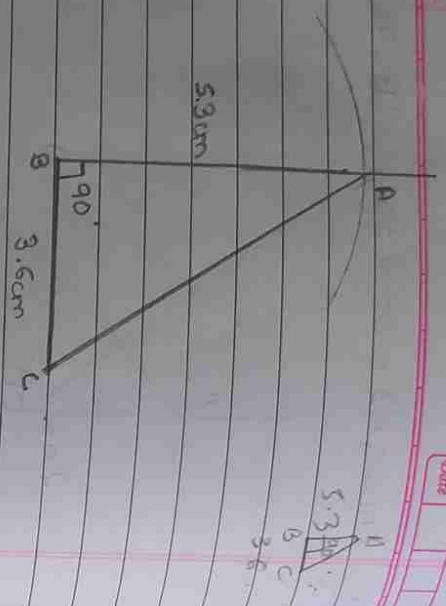


- Q] Construct $\triangle PQR$: $PQ = 4\text{ cm}$, $QR = 6\text{ cm}$, $\angle Q = 110^\circ$

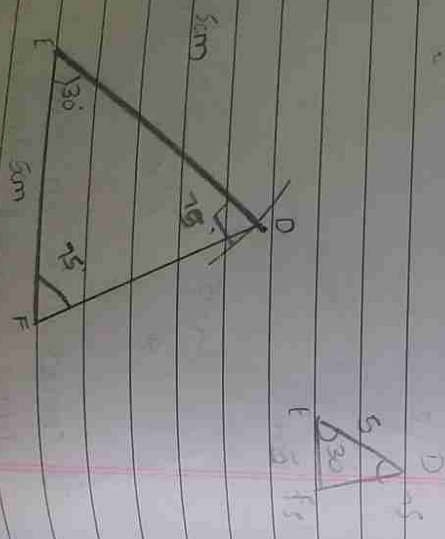


- Q] Construct an isosceles triangle $\triangle ABC$, height - angled at C in which $AB = 5.3\text{ cm}$ and $\angle C = 36^\circ$. Also measure the other two angles.

-1

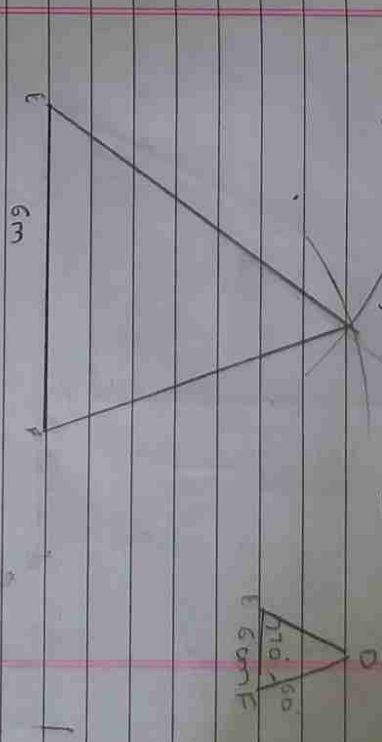


6. Construct ΔADE in which $BE = EF = 5\text{ cm}$ and 30° . Measure $\angle E$ and $\angle F$.

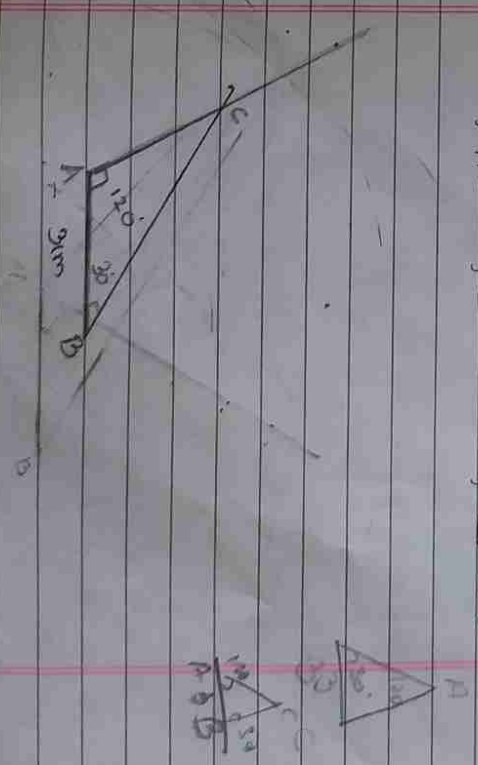


7.

a) Construct the following triangle ΔDEF ; $EF = 6\text{ cm}$, $\angle E = 70^\circ$, $\angle F = 60^\circ$

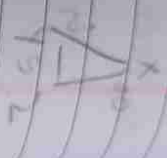
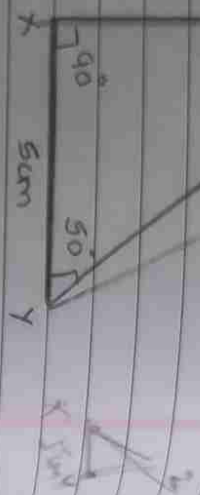


b) ΔABC ; $AB = 3\text{ cm}$, $\angle A = 120^\circ$, $\angle B = 30^\circ$



CHITA

3) ΔXYZ , $\angle X = 50^\circ$, $\angle Y = 90^\circ$, $\angle Z = 40^\circ$



21/1/2025

Perimeter and Area



I Summary:-

- Perimeter is the distance around a closed figure.
- Perimeter of Square, $4 \times \text{side} = 4s$ units.
- Perimeter of rectangle $= 2(l + b)$ units
- Perimeter of Δ , $P = a + b + c$
If ΔABC is a Δ with side a, b, c
- Perimeter of equilateral Δ , $P = 3a$
- Area:-
- A closed figure occupies some surface of a plane. The amount of the surface within the closed figure is called

→ Area of square = (Side)² = A(5)² sq unit

→ Area of rectangle = (l × b) sq unit

→ Area of right angled Δ = $\frac{1}{2} \times b \times h$ sq unit

→ Area of right angled Δ = $\frac{1}{2} \times b \times h$ sq unit

→ Area of Δ = $\frac{1}{2} \times b \times h$ sq unit.

Revision

1. Find both perimeter and area of given figure:-



Perimeter :- 4 × Side = 4

$$4 \times 8 = 32 \text{ cm}$$

Area:

$$A = (s^2)$$

$$A = \text{side} \times \text{side}$$

$$A = 8 \times 8$$

$$A = 64 \text{ sq cm}$$

Given



$$4 \times 5 = 4 \times 2(2+b)$$

$$14 \times 8 = 112 \text{ units cm}$$

Perimeter

$$P = 2(l + b)$$

$$P = 2(14 + 8)$$

$$P = 2(22)$$

$$P = 44 \text{ unit cm}$$

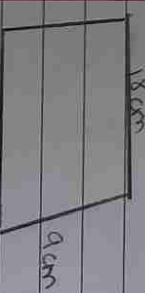
Area:

$$A (l \times b)$$

$$A = (14 \times 8)$$

$$A = 112 \text{ sq cm}$$

*



A =

$$(b \times h) \text{ sq.}$$

$$= (18 \times 9) \text{ sq}$$

$$= 162 \text{ sq cm}$$

$$P = 18 + 9 \text{ cm}$$

$$= 27 \text{ unit cm}$$

II Find the perimeter of given figure.



$$\begin{aligned}
 &= AB + BC + CD + DE + EF + FG + GH + HA \\
 &= 3\text{cm} + 2\text{cm} + 1\text{cm} + 1\text{cm} + 1\text{cm} \\
 &= 8\text{cm}
 \end{aligned}$$

Exercise 15.1

I Find the area of a rectangle ABCD given that:
AB = 12cm, AD = 5cm



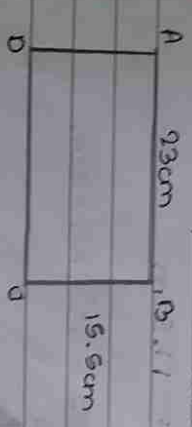
Kind Area :- $A = l \times b$

Formula :- $A = (l \times b) \text{ sq}$

$$A = (12 \times 5) \text{ cm}$$

$$A = 60 \text{ sq cm}$$

II BC = 15.5cm, AB = 23cm

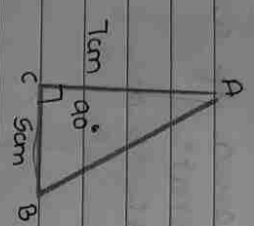


Kind Area :- Formula :- $A = (l \times b) \text{ sq}$

$$A = (23 \times 15.5) \text{ sq}$$

$$A = 356.5 \text{ sq cm}$$

II Find the area of $\triangle ABC$ given that:
a) $BC = 5\text{ cm}$, $CA = 7\text{ cm}$, and $\angle C = 90^\circ$



$$\text{Area} = \frac{1}{2} \times b \times h$$

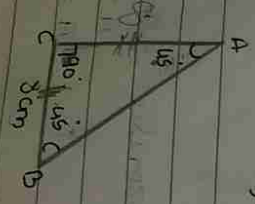
$$= \frac{1}{2} \times 5 \times 7$$

$$= \frac{1}{2} \times 35$$

$$= \frac{35}{2}$$

$$= 17.5\text{ cm}$$

b) $\triangle ABC$, $\angle CAB = 45^\circ$, $AC = 8\text{ cm}$



$$\text{Area} = \frac{1}{2} \times b \times h$$

$$= \frac{1}{2} \times 8 \times 8$$

$$= \frac{1}{2} \times 64$$

$$= \frac{1}{2} \times 64$$

$$= \frac{32}{1} = 32\text{ cm}$$

3) Find the length of the base of a triangle whose area is 220 m^2 and altitude is 11 m

$$A = 220\text{ m}^2$$

$$h = \text{altitude} = 11\text{ m}$$

$$b = ?$$

$$A = \frac{1}{2} \times b \times h$$

$$220 = \frac{1}{2} \times b \times 11$$

$$220 = \frac{11b}{2}$$

$$220 \times 2 = 11b$$

$$440 = 11b$$

$$b = \frac{440}{11}$$

$$b = 40\text{ m}$$

4] $A = 120 \text{ m}^2$

$h = 8 \text{ cm}$

$b = ?$

$A = \frac{1}{2} \times b \times h$

$120 = \frac{1}{2} \times b \times 8$

$120 = \frac{8}{2} b$

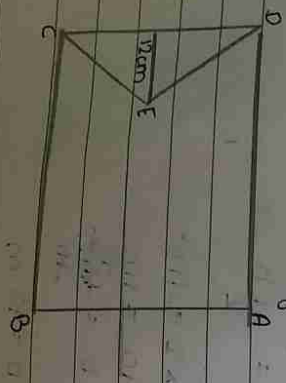
$120 \times 8 = 8b$

$960 = 8b$

$b = \frac{960}{8}$

$b = 120 \text{ m}$

5] Find the area of the shaded portion from the measurements given in figure.



Find the area of shaded portion Area of shaded portion :-

Area of $\square ABCD$
Area of $\triangle ADE$

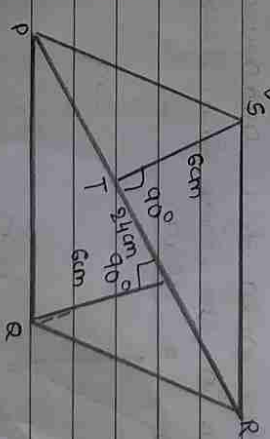
$[C \times b]$

$30 \times 20 = \frac{1}{2} \times 10 \times 20 = \frac{200}{2}$

$600 - 100$

500 cm

6] Find the area of a parallelogram PQRS if PR = 24 cm and QV = 5 cm.



$$= \text{Area of } \square^{9\text{m}} = \text{Area of } \triangle PQR + \text{Area of } RPS$$

Given, $\triangle PQR$, $b = 24$, $h = 6$
 $\triangle RPS$, $b = 24$, $h = 6$

$$\therefore \text{Area of } \square^{9\text{m}} = \frac{1}{2} \times b \times h + \frac{1}{2} \times b \times h$$

$$= \frac{1}{2} \times 24 \times 6 + \frac{1}{2} \times 24 \times 6$$

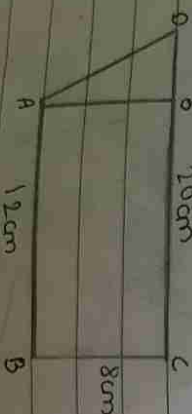
$$= \frac{1}{2} \times 144 + \frac{1}{2} \times 144$$

$$= \frac{144}{2} + \frac{144}{2}$$

$$= 72 + 72$$

$$= 144 \text{ cm}^2$$

3] Calculate the area of a quadrilateral ABCD shown in the figure given below:



Find $\triangle ABC$ and find the area $\triangle ABC$ and $\triangle ADC$

$$= \text{Area of } \triangle ABC + \text{Area of } \triangle ADC$$

Consider $\triangle ABC$
 $b = 12 \text{ m}$, $h = 8 \text{ m}$

Consider $\triangle ADC$
 $b = 20 \text{ m}$, $h = 8 \text{ m}$

$$\therefore \text{Area of Trapezium} = \text{Area of } \triangle ABC + \text{Area of } \triangle ADC$$

$$= \left[\frac{1}{2} \times b \times h \right] + \left[\frac{1}{2} \times b \times h \right]$$

$$= \left[\frac{1}{2} \times 12 \times 8 \right] + \left[\frac{1}{2} \times 20 \times 8 \right]$$

$$= \left[\frac{1}{2} \times 96 \right] + \left[\frac{1}{2} \times 160 \right]$$

$$= \frac{96}{2} + \frac{160}{2}$$

$$= 48 + 80$$

$$= 128 \text{ m}^2$$

8] The base and height of a triangle are in the ratio 4:5. If the area of the triangle is 40 sq. m, find the measures of its base and height.

=>

Given,

base = $4x$ m

height = $5x$ m

area = 90 sq. m

Area of Δ = $\frac{1}{2} \times b \times h$

$90 = \frac{1}{2} \times 4x \times 5x$

$90 \times 2 = 20x^2$

$180 = 20x^2$

$\frac{180}{20} = x^2$

$9 = x^2$

$x^2 = \sqrt{9}$

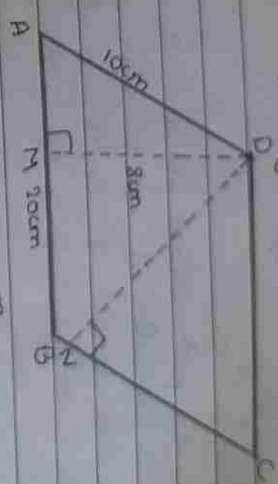
$x = 3$

base = $4x = 4 \times 3 = 12$ m

height = $5x = 5 \times 3 = 15$ m

9] In a parallelogram ABCD, the length of the side is corresponding to its base, what is the length of the side

corresponding to AC = ?



=> In the given $\square$ ABCD

consider Δ ABD

$b = 20$ cm $h = 8$ cm

consider Δ BOC

$b = 10$ cm $h = ?$

Area of Δ ABD = Area of Δ BOC

$\frac{1}{2} \times b \times h = \frac{1}{2} \times b \times h$

$\frac{1}{2} \times 20 \times 8 = \frac{1}{2} \times 10 \times h$

$\frac{1}{2} \times 160 = 5 \times h$

$80 = 5 \times h$

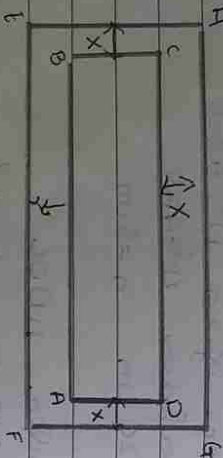
$h = \frac{80}{5}$

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$$h_2 = 16 \text{ m}$$

Introduction

Case 1: When a path runs around a field let us consider a rectangular field ABCD with the length l units and the breadth b units. A path of width x units



Hence the length of the outer rectangle EFGH is

$$EF = [x + 1 + x = 1 + 2x]$$

The breadth of the outer rectangle EFGH is

$$FG = [x + b + x = b + 2x]$$

$\therefore$ Area of outer rectangle EFGH is

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

Area of inner rectangle ABCD

$$= l \times b$$

Area of path.

$$= (1 + 2x)(b + 2x) - l \times b$$

Case 2) When the path runs across the middle of a garden, the path parallel to the length and the other path parallel to the breadth.

In this case the area of the path parallel to length $= 2x \times 59$ units and the other the path parallel to breadth $b = x \times 19$ units

Hence the total area of the path =

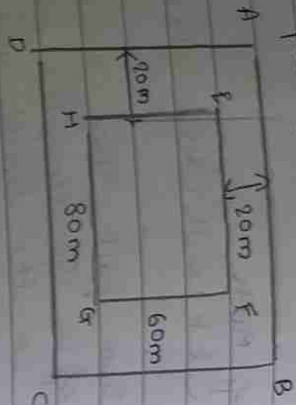
The area of the path along the length =

The area of the path along the breadth =

$$+ (b \times x) - (2x \times x) \text{ square units.}$$

Revision

① Find path areas ABCD and EFGH.



a) Area of $\square$ EFGH

$$l = 80 \text{ m} \quad b = 60 \text{ m}$$

$$A = l \times b \text{ m}^2$$

$$A = 80 \times 60 \text{ m}^2$$

$$A = 4800 \text{ m}^2$$

b) Side of $\square$ ABCD

$$l = 80 + 20 + 20 = 120 \text{ m}$$

$$b = 60 + 20 + 20 = 100 \text{ m}$$

c) Area of ABCD

$$A = l \times b$$

$$A = 120 \times 100$$

$$A = 12000 \text{ m}^2$$

d) Area of Path:

$$12000 - 4800 \text{ m}^2$$

$$= 7200 \text{ m}^2$$

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②

a) Area of rectangle EFGH

$$A = l \times b$$

$$A = l \times b$$

$$A = 550 \times 250 \text{ m}^2$$

$$A = 137500 \text{ m}^2$$

b) Side of ABCD

$$l = 550 - [25 + 25] = 500 \text{ m}$$

$$b = 250 - [25 + 25] = 200 \text{ m}$$

c) Area of ABCD

$$A = l \times b$$

$$A = 500 \times 200$$

$$A = 100000 \text{ m}^2$$

d) Area of path:

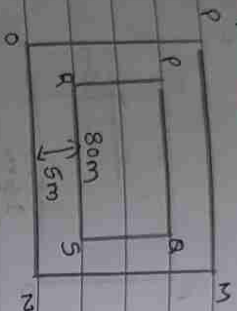
$$137500 - 100000$$

$$= 37500 \text{ m}^2$$

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Find the path between P and M



a) Area of $\square PQRS$

$$50 \times 50 \text{ m}^2 = 2500 \text{ m}^2$$

b) Side of $\square PQRS$

$$50 + 5 + 5 = 60 \text{ m}$$

c) Area of ABCD

$$(60 \text{ m})^2 = 3600$$

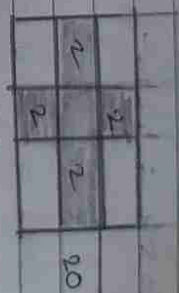
d) Area of Path:

$$3600 - 2500 \text{ m}^2$$

$$1100 \text{ m}^2$$

$$\begin{array}{r} 216 \\ 54 \times 4 \\ \hline 216 \\ 210 + \\ \hline 2916 \end{array}$$

Ex 10



a) Area of road along the length

$$30 \times 2 = 60 \text{ m}^2$$

b) Area of road along the breadth

$$20 \times 2 = 40 \text{ m}^2$$

c) Area of roads = (length) - (Area shaded)

$$(60 + 40) \text{ m}^2 = 2 \times 2 \text{ m}^2$$

$$100 - 4 \text{ m}^2$$

$$96 \text{ m}^2$$

(2)



a) Area of road along the length

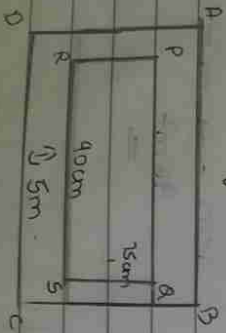
$$40 \times 4 = 160 \text{ m}^2$$

b) Area of road along breadth
 $= 30 \times 4 = 120 \text{ m}^2$

c) Area of roads $= (L+b) - (\text{Area Shaded})$
 $= 120 + 160 \text{ m}^2 - 4 \times 4 \text{ m}^2$
 $= 280 \text{ m}^2 - 16 \text{ m}^2$
 $= 264 \text{ m}^2$

Exercise 15.2

- 1] A garden is 90m long and 75m broad. A path 5m wide is to be built all around [outside] it along its border. Find the area of the path.



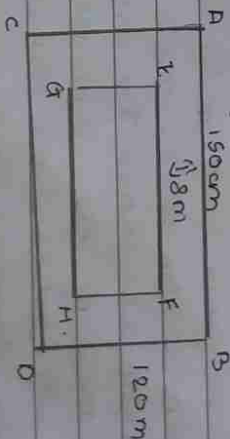
a) Area of $\square PQRS$
 $L \times b = 90 \text{ m} \times 75 \text{ m}$
 $= 6750 \text{ m}^2$

b) Side of $\square ABCD$
 $90 + 5 + 5 = 100 \text{ m}$
 $75 + 5 + 5 = 85 \text{ m}$

c) Area of $\square ABCD$
 $100 \times 85 \text{ m}^2$
 $= 8500 \text{ m}^2$

d) Area of path
 $8500 \text{ m}^2 - 6750 \text{ m}^2$
 $= 1750 \text{ m}^2$

- 2] The outer length and breadth of a painting is 150 cm x 120 cm. If there is a margin of 8 cm with all around the painting, find the area of the actual painting without the margin.



a) Area of $\square ABCD$

$$A = l \times b$$

$$A = 150 \times 120 \text{ m}^2$$

$$A = 18000 \text{ m}^2$$

b) Side of $\square EFGH$

$$= 150 - [8 + 8] = 134 \text{ m}$$

$$120 - [8 + 8] = 104 \text{ m}$$

c) Area of $\square EFGH$

$$134 \times 104 \text{ m}^2$$

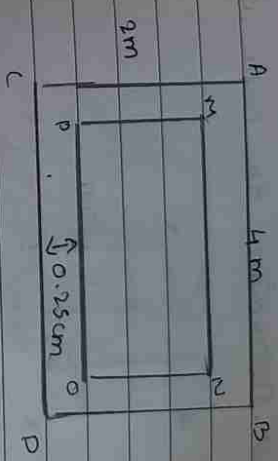
$$13936 \text{ m}^2$$

d) Area of path :-

$$18000 - 13936 \text{ m}^2$$

$$4064 \text{ m}^2$$

3) A table cover $4 \text{ m} \times 2 \text{ m}$ is spread on a table. If 25 cm of the table cover is hanging all around the table, find the area of the tablecloth and the cost of making the tablecloth at $\text{Rs } 25 \text{ per square metre}$.



Area of $\square ABCD$

$$l \times b = 4 \times 2 \text{ m}$$

$$A = 8 \text{ m}^2$$

b) Side of $\square PQRS$

$$4 - [0.25 + 0.25] = 4 - 0.50 = 3.50 \text{ m}$$

$$2 - [0.25 + 0.25] = 2 - 0.50 = 1.50 \text{ m}$$

c) Area of $\square PQRS$

$$3.50 \times 1.50$$

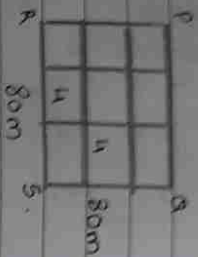
$$5.25 \text{ m}^2$$

$$5.25 \times 25 \text{ Rs/m}^2$$

$$131.25 \text{ Rs}$$

4. The side of a square plot is 80 m . Two paths of 4 m width along the sides of the square are constructed in the

of the plot, determine the area of the path.

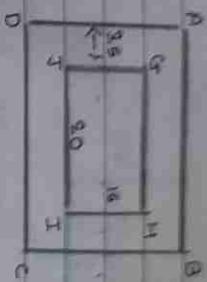


a) Area of Square plot along length.
 $80 \times 4 = 320 \text{ m}^2$

b) Area of Square plot along breadth.
 $80 \times 4 = 320 \text{ m}^2$

c) Area of Square plot = (l * b) - Area of path.
 $= 320 \text{ m}^2 + 320 \text{ m}^2 - 4 \times 4 \text{ m}^2$
 $= 640 \text{ m}^2 - 16 \text{ m}^2$
 $= 624 \text{ m}^2$

5. A person measuring 20m x 16m is placed in a sheet of cardboard such that there is a margin of 3.5cm along each side of the sheet. find.
- i) The area of the margin.
- ii) The cost of cardboard used at 1.50 per sq



a) Area of $\square$ GHSE
 $= l \times b = 20 \times 16$
 $= 320 \text{ m}^2$

b) Side of $\square$ HBCD:
 $20 + (3.5 + 3.5) = 7.0 = 20 + 7.0 = 27$
 $16 + (3.5 + 3.5) = 7.0 = 16 + 7.0 = 23$

c) Area of $\square$ ABCD
 $27 \times 23 = 621 \text{ m}^2$

d) Area of Path
 $320 \text{ m}^2 - 621 \text{ m}^2$
 301 m^2

Rough

$$\begin{array}{r} 27 \\ \times 23 \\ \hline 81 \\ 54 \\ \hline 621 \end{array}$$

- 6] A grassy plot is 100m x 80m. Two cross-paths of 5m width are constructed at right angles through the centre of the field and parallel to the sides of the plot.

Find the total area used as path.



$$= \text{Area of garden with length} \\ = 100 \times 5 = 500 \text{ m}^2$$

$$= \text{Area of garden along with breadth} \\ 80 \times 5 = 400 \text{ m}^2$$

$$= \text{Area of garden} = (\text{Lth}) - (\text{Area of shield}) \\ 500 + 400 \text{ m}^2 = 5 \times 5 \text{ m}^2 \\ 900 \text{ m}^2 - 25 \text{ m}^2$$

$$875 \text{ m}^2$$

Circle

Surrounding :-
A circle is a closed plane figure in which all points on its boundary are equidistant from a fixed point inside the circle.

Define :-

- radius
- diameter
- circumference

a) radius :- A line segment joining the centre of a circle to any point on the circle is called its radius.

b) diameter :- A line segment passing through the centre of the circle with end points lying on the circle is called diameter of the circle.

c) circumference :- A perimeter of a circle is called its circumference and is denoted by 'C'.

formula

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

1) $d = 2x$

2) $x = \frac{d}{2}$

3) $d = \pi r$

4) $c = 2\pi r$

5) $c = \pi d$

Ex. 15.3

Find the diameter of given radius

(a) $r = 25$

b) $d = 2x$

c) $d = 2(25)$

d) $d = 50 \text{ cm}$

e) $d = 2(10)$

f) $d = 20 \text{ cm}$

g) $d = 2(12)$

II

Find the radius of given circumference

($r = \frac{d}{2}$)

a) $c = 62.4 \text{ cm}$

$\Rightarrow r = \frac{62.4}{2}$

$r = 31.2 \text{ cm}$

b) $c = 68 \text{ cm}$

$\Rightarrow r = \frac{68}{2}$

$r = 34 \text{ cm}$

$r = 34 \frac{1}{2} \text{ cm}$

c) $r = 25 \text{ m}$

$\Rightarrow r = \frac{d}{2}$

$r = \frac{15}{2}$

d) $c = 35 \text{ m}$

$\Rightarrow r = \frac{35}{2}$

$r = 17.5 \text{ m}$

$r = 1.9 \text{ cm}$

$r = 17.5 \text{ m}$

III Find the circumference when r

($c = 2\pi r$)

a) $r = 25 \text{ cm}$

$\Rightarrow c = 2 \times 22 \times 25$

$c = 2200 \text{ cm}$

$c = 22 \times 25 \times 2$

$c = 1100 \text{ cm}$

$c = 1760$

$$C = \frac{2\pi r}{1} = \frac{2 \times 3.14 \times 24.2}{1} = 157.1 \text{ cm}$$

$$C = 2\pi r = 2 \times 3.14 \times 24.2 = 157.1 \text{ cm}$$

$$b) \quad 32 \text{ cm} \quad C = 2\pi r = 2 \times 3.14 \times 32 = 201.14 \text{ cm}$$

$$C = 2\pi r = 2 \times 3.14 \times 32 = 201.14 \text{ cm}$$

$$C = \frac{44 \times 32}{1} = 1408$$

$$C = \frac{1408}{1} = 1408$$

$$C = 201.14 \text{ cm}$$

d) 80 cm

$$\Rightarrow C = 2\pi r = 2 \times 3.14 \times 80 = 502.4 \text{ cm}$$

$$C = 2\pi r = 2 \times 3.14 \times 80 = 502.4 \text{ cm}$$

$$C = \frac{44 \times 80}{1} = 3520$$

$$C = \frac{3520}{1} = 3520$$

$$C = 50.8 \text{ cm}$$

Find the circumference of circle given $C = 2\pi r$

$$a) \quad 25 \text{ cm} \quad C = 2\pi r = 2 \times 3.14 \times 25 = 157.1 \text{ cm}$$

$$C = 2\pi r = 2 \times 3.14 \times 25 = 157.1 \text{ cm}$$

$$C = 2\pi r = 2 \times 3.14 \times 25 = 157.1 \text{ cm}$$

$$C = 2\pi r = 2 \times 3.14 \times 25 = 157.1 \text{ cm}$$

$$C = 2\pi r = 2 \times 3.14 \times 25 = 157.1 \text{ cm}$$

$$C = 2\pi r = 2 \times 3.14 \times 25 = 157.1 \text{ cm}$$

$$C = 2\pi r = 2 \times 3.14 \times 25 = 157.1 \text{ cm}$$

The circumference of a circle is 4π . Find the area of circle.

Given

$$C = 4\pi$$

$$A = \pi r^2$$

$$r = 1$$

$$\therefore \pi r^2 = 4\pi$$

$$r = \sqrt{4}$$

$$r = 2$$

$$A = \pi r^2$$

$$= \frac{22}{7} \times 2 \times 2 = \frac{88}{7}$$

$$= 12.56 \text{ m}^2$$

4. A track in the form of ring

whose inner and outer circumference

are 88m and 132m

respectively. Find the width of

the track.

∴ outer circumference = 132m

inner " = 88m

$$C = 2\pi r$$

Radius of outer

circle

$$132 = 2 \times \frac{22}{7} \times r$$

$$132 = \frac{44}{7} r$$

$$132 \times 7 = 44r$$

Radius of inner

circle

$$88 = 2 \times \frac{22}{7} \times r$$

$$88 \times 7 = 44r$$

$$r = \frac{88 \times 7}{44}$$

$$r = \frac{154 \times 7}{44}$$

$$44r$$

$$r = 21 \text{ m}$$

width of track

outer radius - inner radius

$$21 - 14 \text{ m}$$

$$7 \text{ m}$$

Extra done :- Revision

outer circumference = 152m

inner circumference = 78m

Find the width of Area

$$C = 2\pi r$$

Radius of outer O

$$152 \text{ m} = 2 \times \frac{22}{7} \times r$$

$$152 \text{ m} = \frac{44}{7} r$$

$$152 \text{ m} \times 7 = 44r$$

$$r = \frac{152 \times 7}{44}$$

$$r = \frac{266 \text{ m}}{11}$$

Radius of inner circle

$$78 \text{ m} = 2 \times \frac{22}{7} \times r$$

$$78 \text{ m} = \frac{44}{7} r$$

$$78 \times 7 \text{ m} = 44r$$

$$r = \frac{78 \times 7}{44}$$

$$r = \frac{19.5 \text{ m}}{11}$$

$$n = \frac{12.4}{18.5} \times 360$$

$$n = 241.4$$

The width of house - outer

$$24 - 12.4 \text{ m}$$

$$= 11.6 \text{ m}$$

5. Find the area of a circular ring whose inner and outer radii are 16 m and 19 cm respectively.
width of the track: outer circumference - inner "

Outer circle = $A = \pi r^2$

$$= \frac{22}{7} \times 19 \times 19$$

$$= \frac{22}{7} \times 361$$

inner circle $A = \pi r^2$

$$= \frac{22}{7} \times 16 \times 16$$

$$= \frac{22}{7} \times 256$$

inner and outer

$$361 - 256$$

$$= 105 \frac{1}{5}$$

$$= \frac{22}{7} \times 105 = 22 \times 15 = 330 \text{ cm}^2$$

(6) In a circular garden of 50m radius, a pond is constructed in the form of a radius 20m. find the area of the land left out.

Area of a garden

$$r = 50 \text{ m}$$

$$\Rightarrow A = \pi r^2$$

$$A = \pi (50)^2$$

$$A = \pi \times 2500 \text{ m}^2$$

Area of pond

$$r = 20 \text{ m}$$

$$A = \pi r^2$$

$$= A (20 \times 20)$$

$$A = 400 \text{ m}^2$$

Area left out :-

$$\pi (2500 - 400)$$

$$\pi = (2500 - 400)$$

$$22 \times 300 = 6600 \text{ m}^2$$

NAME:
 Data Handling and Probability.

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