Math

Primary 6

Second term

General Revision

By

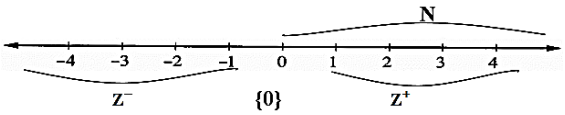
Mr / Abdelrahman Ahmed Zaki

Ph / 01018661144

Final revision

Primary (6)

- **Set of natural numbers (N)** = { 0 , 1, 2 , 3 , ……}
- **Set of integers numbers (Z)** = { …… , –3 , –2 , –1 , 0 , 1, 2 , 3 ,…….}
- **Set of positive integers (Z^+)** = { 1, 2 , 3 , ……..}
- **Set of negative integers (Z^-)** = { –1, – 2 ,– 3 , ……..}
- **Z = $Z^+ \cup \{0\} \cup Z^-$**



✓ **The absolute value of the integer's number denoted by**

|4| = 4 , |– 4|= 4 , If |x|= 7 then x = 7 or – 7

✓ **Use the properties of addition to find**

24 + (–19) + (–24) + 9 Commutative

= [24 + (–24)] + [9 + (–19)] Associative

= 0 + (–10) Additive inverse

= (–10) Additive Neutral

✓ **Use the properties of multiplication to find**

(–35) × (–42) + (–35) × (52)

= (–35)× [(– 42) + 52]

= (– 35)× 10 = – 350

✓ **The concept of the equation**

It's a mathematical relation which contains one unknown or more and the equality relation (=)

✓ **The concept of the inequality**

It's a mathematical relation which contains one unknown or more and the equality relation (< or >)

1) Find the solution set of the equation x +2 = 5 , if the substitution set is { –2 , 3 , 4 }

x +2 = 5

At x = –2 (–2) +2 = 0 false

At x = 3 (3) +2 = 5 true

At x = 4 (4) +2 = 6 false

The solution set = { 3}

2) Find the solution set of the equation 2x +1 = 5 , if the substitution set is { –1,–2, 0, 3}

2 x +1 = 5

At x = –1 2× (–1) +1 = –1 false

At x = –2 2 × (–2) +1 = –3 false

At x = 0 2× (0) +1 = 1 false

At x = 3 2×(3) +1 = 7 false

The solution set = { } or ∅

3) Find the solution set of the inequality 3x –1 >–2 , if the substitution set is { –2 , –1 , 0 , 1 }

3 x –1 > –2

At x = –2 3 × (–2) –1 =– 7 false

At x = –1 3× (–1) –1 = – 4 false

At x = 0 3 × (0) –1 = –1 true

At x = 1 3 × (1) –1 =2 true

The solution set = {0 , 1 }

4) Find the solution set of 2 x –5 = 13 , x ∈Z

2 x –5 = 13 + 5

2x = 18 ÷ 2

x = 9 s.s ={ 9 }

5) Find the solution set of 2x + 5 < 11 , x ∈Z , x ∈N

2x + 5 < 11– 5

2x < 6 ÷ 2

x< 3

s.sin Z ={ 2 , 1 , 0 , – 1 , …..}

s.s in N = { 2 , 1 , 0 }

6) **Find the solution set of 2x – 1 ≤ x + 3 , x ∈Z**

–x

2x – 1 ≤ x + 3

x – 1 ≤ 3 + 1

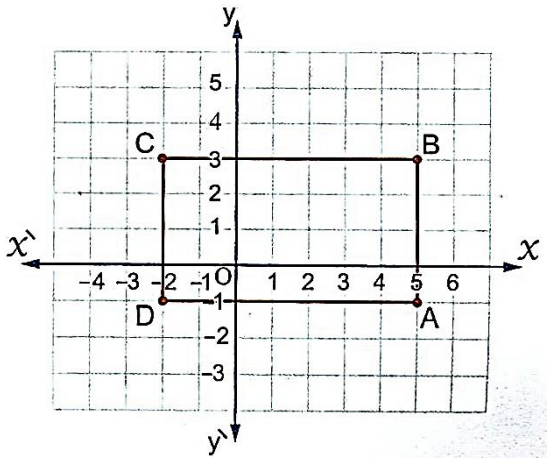
x ≤ 4

s.sin Z ={ 3 , 2 , 1 , …… }

- **Remark: Multiply or divide by a negative, must be to change the sign**

Graphing points in the coordinate plane

1) On the coordinate plane determine the points A(5 , – 1) , B (5 , 3) , C(– 2 , 3) , D(– 2 , –1) mention the name of the figure , find its area and perimeter

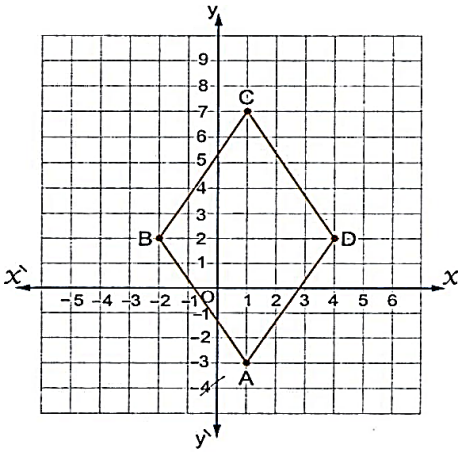


Answer

1) The name of the figure ABCD is a rectangle.
2) The length DA =| 5– (–2) | **= 7 units**
   The width AB =| 3– (–1) | **= 4 units**
3) **The area = L × W** = 7 × 4 = 28 square units
4) **The perimeter = (L + W) × 2**= (7 + 4) × 2 = 22 units

---

2) On the coordinate plane determine the points A = (1 , –3) , B = (–2 , 2) , C = (1 , 7), D = (4 , 2)mention the name of the figure , Find the area of the figure ABCD



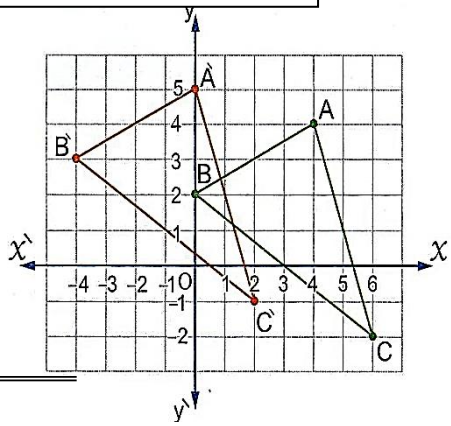
Answer

1) ABCD is a rhombus.
2) The length of AC = | 7 – (–3)| = 10 units.
3) The length of BD = | 4 – (–2) | = 6 units.
4) The area of the rhombus = ½ × d_1 × d_2= ½ × 10 × 6 = 30

Translation

Remarkthe point A (x , y) + the translation (a , b) = A′ (x + a , y + b)

1) Draw on a square lattice Δ ABC where A (4 , 4) , B (0 , 2) and C (6 , – 2)then , find its image by translation (x , y) → (x – 4 , y + 1)



Answer

A (4 , 4) $\xrightarrow{(x-4\,,\,y+1)}$ A′ (0 , 5)

B (0 , 2) $\xrightarrow{(x-4\,,\,y+1)}$ B′ (–4 , 3)

C (6 ,– 2) $\xrightarrow{(x-4\,,\,y+1)}$ C′ (–2 , –1)

---

2) The image of the point A (–5 , 2) by translation (–1 , –3) is ……

A (–5 , 2) + (–1 , –3) = A′ (–6 , –1)

---

3) If the image of the point A (3 , 2) is the point (6 , 1)by translation is ……

A + the translation = A′

(3 , 2) + the translation = (6 , 1) – (3 , 2)

The translation = (3 , –1)

4) If A′ (3 , – 3) is the image of A by translation (x , y) → (x –1 , y – 4),then the point A is …..

A + the translation = A′

A + (–1 , – 4) = (3 , –3) – (–1 , – 4)

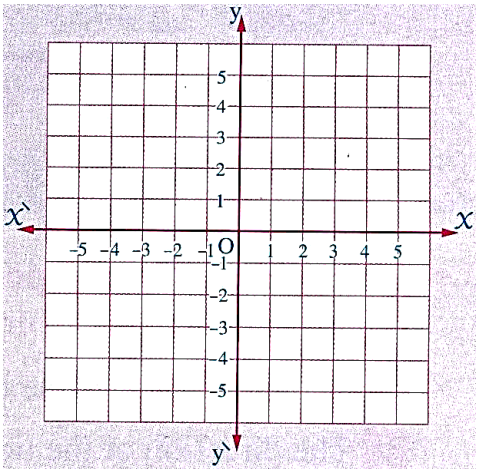
A = (4 , 1)

3) On the coordinate plane determine the position of the following points :A = (–1 , – 3) , B = (4 , – 3) , C = (–1 , 2) , then find

1) the length of AB = ---------- , AC = ----------

2) The area of Δ ABC = ----------

3) The type of the triangle ABC with respect to its side lengths is -------- , the type of the triangle with respect to its angles is ----------



1) AB = | –1 – 4 | = 5 units. AC = | –3 – 2 | = 5 units

2) area of Δ ABC = ½ × b × h = ½ × 5 × 5 = 12.5

3) **Isosceles** Δ – right Δ

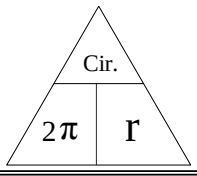
- **Remember:**

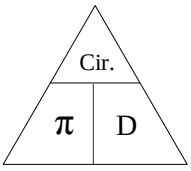
✓ **Types of the triangle according to it sides:**
Equilateral Δ – isosceles Δ – scalene Δ

✓ **Types of the triangle according to it angles:**
Acute Δ – right Δ – obtuse Δ

Area of the circle

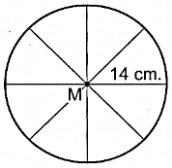
- **Remember :**
  - ✓ Diameter of the circle = 2 r
  - ✓ Circumference of the circle = 2 π r
  - ✓ Area of the circle = πr^2





---

1) In the opposite figure a circle M of a radius14 cm is divided into eight equal circular sectors. Calculate the surface area of one sector where $\pi = \frac{22}{7}$

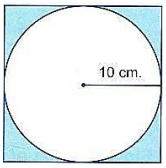


Area of the circle $= \frac{22}{7} \times (14)^2 = 616$ cm^2

Area of one sector = 616 ÷ 8 = 77 cm^2

---

2) In the opposite figure a circle inside a square calculate the area of the colored part (π = 3.14)



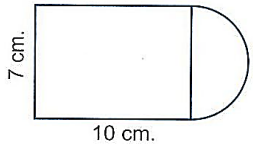
Area of the square = s × s = 20 × 20 = 400 cm^2

Area of a circle = π r^2 = 3.14 × $(10)^2$ = 314cm^2

Area of the colored part = 400 – 314= 86 cm^2

---

3) In the opposite figure calculate its surface area ($\pi = \frac{22}{7}$)



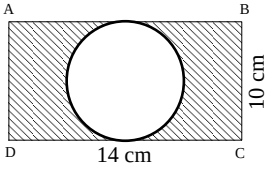
Area of rectangle = L × W = 10 × 7 = 70 cm^2

Area of half circle = ½ π r^2 = ½ × $\frac{22}{7}$ × $(3.5)^2$ = 19.25cm^2

Area of the figure = 70 + 19.25 = 89.25 cm^2

---

4) In the opposite figure ABCD is rectangle it length 14 cm, its width 10 cm, a circle is drawn to touch the sides $\overline{AB}$ and $\overline{AD}$, calculate the area of the colored part (π = 3.14)



Area of rectangle = L × W = 14 × 10 = 140 cm^2

Area of circle = π r^2 = 3.14 × $(5)^2$ = 78.5cm^2

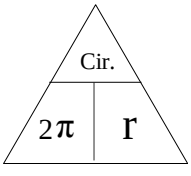
Area of the colored part = 140 – 78.5= 61.5 cm^2

---

5) Calculate the area of the circle whose circumference is 44 cm.($\pi = \frac{22}{7}$)

$r = \frac{cir}{2\pi} = \frac{44}{2 \times \frac{22}{7}} = 7$ cm

Area of circle = π r^2 = $\frac{22}{7}$ × $(7)^2$ = 154 cm^2



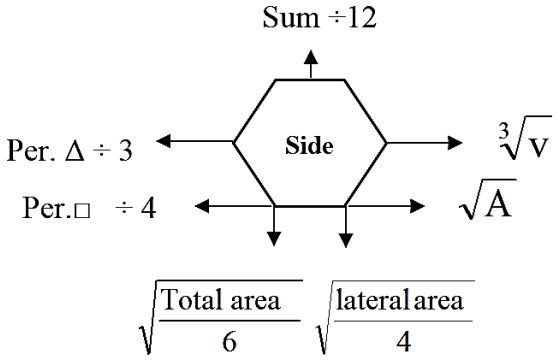
Lateral surface area and total area of a cube

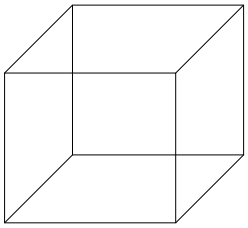
- **Remember**

✓ **Volume of the cube = S × S × S**

✓ **Area of one face = S × S**

✓ **Perimeter of one face = S × 4**

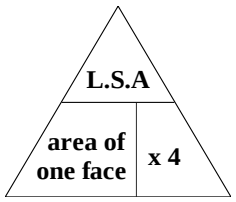




✓ **L. S . A= area of face × 4**

= S × S × 4

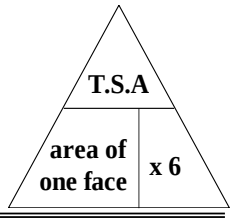
The area of one face = $\frac{\text{lateral area}}{4}$



✓ **T. S . A = area of face × 6**

= S × S × 6

The area of one face = $\frac{\text{total area}}{6}$



1) A cube-shaped box, whose edge length is 3 cm. find the lateral area - the total area.

The lateral area = S × S × 4

= 3 × 3 × 4 = 36 cm^2

The total area = S × S × 6

= 3 × 3 × 6 = 54 cm^2

2) The lateral area of a cube is 28 cm^2 , Find its total area

The area of one face = $\frac{\text{lateral area}}{4} = \frac{28}{4} = 7$ cm^2

The total area = area of one face × 6 = 7 × 6 = 42 cm^2

3) If the perimeter of a face of a cube is 20 cm. Find its lateral area and its total area.

Side = per. ÷ 4 = 20 ÷ 4 = 5 cm

The lateral area = S × S × 4

= 5 × 5 × 4 = 100 cm^2

The total area = S × S × 6

= 5 × 5 × 6 = 150 cm^2

4) If the sum of the edge lengths of a cube is 108 cm. , find :The lateral area - The total area – its volume

Side = 108 ÷ 12 = 9 cm

The lateral area = S × S × 4

= 9 × 9 × 4 =324cm^2

The total area = S × S × 6

= 9 × 9 × 6 = 486 cm^2

V = = S × S × S = 9 × 9 × 9 =729cm^2

5) Find the total area of a cube whose face area is 100cm^2

The total area = area of face × 6 = 100 × 6 = 600 cm^2

6) If the lateral area of a cube = 64 cm^2 , then its volume equals ----------

$S = \sqrt{\frac{L.S.A}{4}} = \sqrt{\frac{64}{4}} = 4$ cm , V = = S × S × S = = 4 × 4 × 4 = 64 cm^3

7) The total surface area of a cube is 100 cm^2, then its volume equals ----------

$S = \sqrt{\frac{T.S.A}{4}} = \sqrt{\frac{600}{4}} = 10$ cm , V = = S × S × S = 10 × 10 × 10 = 1000 cm^3

8) If the volume of a cube is 1000 cm^3 , then its total area = ----------

$S = \sqrt[3]{\text{Volume}} = \sqrt[3]{1000} = 10$ cm , The total area = S × S × 6 = 10 × 10 × 6 = 600cm^2

9) **The ratio between the area of one face of a cube and its lateral area** = 1 : 4

10) **The ratio between the area of one face of a cube and its total area** = 1 : 6

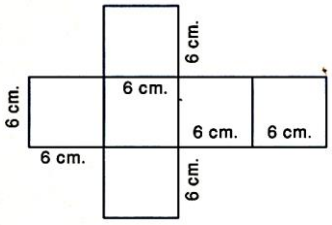
11) **The ratio between the lateral area and the total area of a cube** = 4 : 6 = 2 : 3

When folding the opposite shape :

a. The formed solid is .....

b. The lateral area of this solid is .....

c. The total area of this solid is .....



a) Cube

b) lateral area = S × S × 4
= 6 × 6 × 4 = --- cm^2

c) total area = S × S × 6
= 6 × 6 × 6 = ---cm^2

Probability

- **The random experiment:** It is an experiment in which we can determine all its possible outcomes before carrying it out.
- **Sample space (outcomes space)** :It is a set of all possible outcomes for a random experiment and it is denoted by the symbol (S) and the number of all elements of the sample space is denoted by n (S)
- **The event**: It is a subset of the sample space.
- **Probability of the event**: $P(A) = \frac{\text{The number of elements of A}}{\text{The number of elements of S}} = \frac{n(A)}{n(S)}$
- **Remarks:**

1) the probability of **the impossible event** = 0

2) The probability of **the certain event (sure)** = 1

3) for any event A : $\mathbf{0 \le p(A) \le 1}$

1) If a fair die is thrown once and we observe the number on the upper face, find the probabilities of each of the following events :

$S = \{1, 2, 3, 4, 5, 6\}$, $n(S) = 6$

a) A is the event of appearance of a number greater than 4

$A = \{5, 6\}$, $P(A) = \frac{2}{6} = \frac{1}{3}$

b) B is the event of appearance of an even number.

$B = \{2, 4, 6\}$, $P(B) = \frac{3}{6} = \frac{1}{2}$

B is the event of appearance of an odd number .

$B = \{1, 3, 5\}$, $P(B) = \frac{3}{6} = \frac{1}{2}$

B is the event of appearance of an prime number

$B = \{2, 3, 5\}$, $P(B) = \frac{3}{6} = \frac{1}{2}$

c) C is the event of appearance of the number 5

$C = \{5\}$, $P(C) = \frac{1}{6}$

d) D is the event of appearance of the number 7

$D = \{\ \}$, $P(D) = \frac{0}{6} = 0$ (impossible event)

e) E is the event of appearance of a number less than 7

$E = \{1, 2, 3, 4, 5, 6\}$, $P(E) = \frac{6}{6} = 1$ (sure event)

2) When tossing a coin once and observing its apparent face. $S = \{H, T\}$, $n(S) = 2$

The probability of getting a head = $\frac{1}{2}$

The probability of getting a tail = $\frac{1}{2}$

3) A bag contains some marbles of the same size , if 2 marbles are red , 3 marbles are blue , 5 are white and a marble is drawn randomly , calculate

a) The probability of the drawn marble is red $= \frac{2}{10} = \frac{1}{5}$

b) The probability of the drawn marble is blue $= \frac{3}{10}$

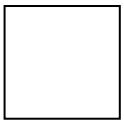
c) The probability of the drawn marble is white $= \frac{5}{10} = \frac{1}{2}$

d) The probability of the drawn marble is not blue $= \frac{8}{10} = \frac{4}{5}$

Lateral surface area and total area of a cuboid

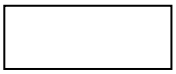
The square

- ✓ Its perimeter = side × 4
- ✓ Its area = side × side



The rectangle

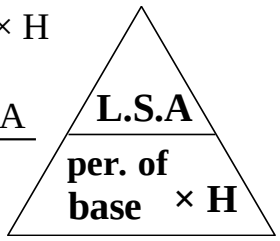
- ✓ Its perimeter = (L +W) × 2
- ✓ Its area = L × W



L. S . A = perimeter of base × H

Perimeter of the base $= \frac{\text{L. S. A}}{\text{H}}$

Hieght $= \frac{\text{L. S. A}}{\text{Perimeter of the base}}$



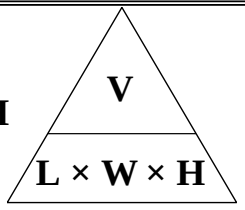
T. S. A = L. S. A + 2 × area of base.

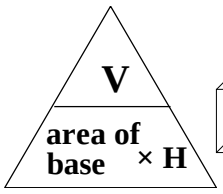
T.S .A without a lid = L.S.A + area of base.

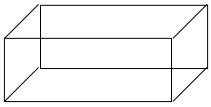
L. S. A = T. S. A – 2 × area of base.

Area of the base $= \frac{\text{T. S. A - L. S. A}}{2}$

Volume of the cuboid = L x W x H







---

1) A cuboid shaped box is 6 cm long, 4 cm wide, and 7 cm high, find its lateral surface area and total area.

- ✓ Perimeter of base = (L +W) × 2
  = (6 + 4) × 2 = 20 cm
- ✓ Area of base = L × W
  = 6 × 4 = 24 cm^2
- ✓ L. S . A = perimeter of base × H
  = 20 × 7 = 140 cm^2
- ✓ T. S. A = L. S. A + 2 × Area of base
  = 140 + 2 × 24 = 188 cm^2

---

2) A cuboid – shaped box with a square base of side length 10 cm and 5 cm high, find its lateral surface area and total area.

- ✓ Perimeter of base = S × 4
  = 10 × 4 = 40 cm
- ✓ Area of base = side × side
  = 10 × 10 = 100 cm^2
- ✓ L. S . A = perimeter of base × H
  = 40 × 5 =200 cm^2
- ✓ T. S. A = L. S. A + 2 × area of base
  = 200+ 2× 100 =400cm^2

---

3) The perimeter of base cuboid is =24 cm and its height 10 cm ,calculate its lateral area.

L. S . A = perimeter of base × H

= 24 × 10 = 240 cm^2

4) A cuboid whose total area = 132 cm^2 and its lateral area = 112 cm^2 .Find the area of its base.

Area of the base = $\frac{\text{T.S.A - L.S.A}}{2} = \frac{132 - 112}{2} = \frac{20}{2} = 10\ cm^2$

---

5) A cuboid whose lateral area is 160 cm^2 and the dimensions of its base are 7 cm and 3 cm. Find its height.

$H = \frac{\text{lateral area}}{\text{perimeter of base}} = \frac{160}{(7+3)\times 2} = 16$ cm

---

6) A cuboid with a square base whose perimeter is 20 cm. and its height is8 cm. Find

a) the lateral area

b) The length of its base side

c) The total area

a) L. S . A = perimeter of base × H

= 20 × 8 = 160 cm^2

b) S = per. ÷ 4= 20 ÷ 4 = 5 cm

c) T. S. A = L. S. A + 2 × $\overbrace{\text{area of base}}^{s\times s}$

= 160 + 2 × 5 × 5 = 210 cm^2

---

7) **The perimeter of the base of a cuboid = 32 cm. and its height = 10 cm, if the length of the base = 9 cm. Find the lateral area and the total area of the cuboid.**

L. S . A = perimeter of base × H

= 32 × 10 =320 cm^2

W = $\frac{\text{per.}}{2}$ - L = $\frac{32.}{2}$ – 9 = 7 cm .

T. S. A = L. S. A + 2 × $\overbrace{\text{area of base}}^{l\times w}$

= 320 + 2 × 9 × 7 = 446 cm^2

---

8) Atin, shaped as a cuboid without a lid, is 18 cm. long and 7 cm. wide and its height is 12 cm. Calculate its lateral area and its total area.

- Perimeter of base = (L + w) × 2

  = (18 + 7)× 2= 50 cm
- Area of base = L × W

  = 18 × 7 = 126 cm^2
- L. S. A = perimeter of base × H

  = 50×12=600 cm^2
- T. S. A = L. S. A + area of base

  = 600 + 126= 726cm^2

---

9) A room in the form of cuboid its inner dimensions are 8 m length, 5 m width and 3 m height. It is wanted to paint its lateral walls and ceiling, the cost price of one square meter is L.E. 10 Calculate the required cost.

- Perimeter of base = (L + w) × 2

  = (8 + 5) ×2 =26 m
- Area of base = L × W

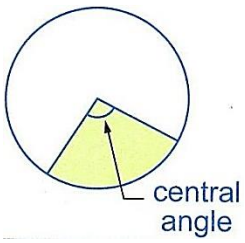
  = 8 × 5 = 40 m^2
- L. S. A = perimeter of base × H

  = 26 ×3 = 78m^2
- T. S. A = L. S. A +Area of base

  = 78 + 40 = 118cm^2
- The cost price = 118 × 10 = L.E 1180

Pie chart

- **The circular sector:** it's a part of the circle bounded by an arc and two radii at the end of the arc.
- The sum of angles accumulative at the center of the circle = 360 °
- All the circle represent 100%
- Sector of **a quarter** circle = $\frac{1}{4}\times$ 360 ° = 90°
- Sector of **a third** circle = $\frac{1}{3}\times$ 360 ° =120 °
- central angle which represent $\frac{1}{8}$ of the circle = $\frac{1}{8}\times$ 360 ° =45°



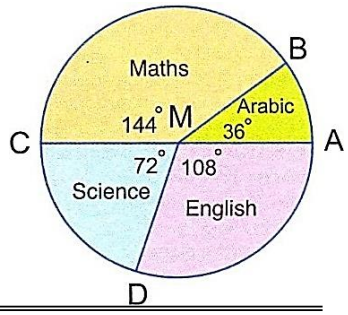
---

1) The following table shows the percentages of the number of hours that Marwa studied in different subjects in a week.

Subject	Arabic	Maths	Science	English
Percentage	10 %	40 %	20 %	30 %

Represent this data by a pie chart.

- ✓ The measure of the central angle for Arabic = $\frac{10}{100}\times 360° = 36°$
- ✓ The measure of the central angle for Maths = $\frac{40}{100}\times 360° = 144°$
- ✓ The measure of the central angle for Science = $\frac{20}{100}\times 360° = 72°$
- ✓ The measure of the central angle for English = $\frac{30}{100}\times 360° = 108°$



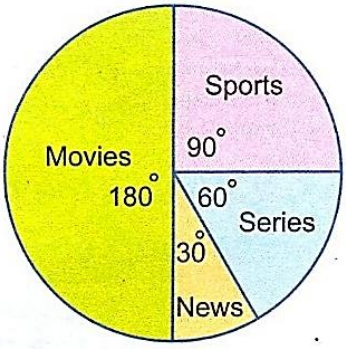
---

2) The following table shows the favorite TV programs for some pupils.

TV program	Sports	News	Series	Movies
Number of pupils	15	5	10	30

Represent this data by a pie chart.

- ✓ The sum of pupils = 15 + 5 +10 + 30 = 60
- ✓ The measure of the central angle for sports = $\frac{15}{60}\times$ 360 ° = 90°
- ✓ The measure of the central angle for news = $\frac{5}{60}\times$ 360 ° = 30°
- ✓ The measure of the central angle for series = $\frac{10}{60}\times$ 360 ° = 60°
- ✓ The measure of the central angle for movies = $\frac{30}{60}\times$ 360 ° = 180°



---

3) A family spends 40% of its income on rent, 25% on food , 20% on other purposes and saves the rest , if the income of the family is 1200 pounds monthly .Represent these data by a pie charts, and find the saving of the family monthly.

- ✓ The percentage saving = 100% - [40% + 25% + 20%] = 15%

	Rent	Food	Other purposes	Savings
Percentage	40%	25%	20%	15%

- ✓ Central angle of rent =40% ×360 = 144°
- ✓ Central angle of food = 25% ×360 = 90°
- ✓ Central angle of other purposes =20% ×360 = 72°
- ✓ Central angle of saving =15% ×360 = 54°
- ✓ What family saves monthly = 15% ×1200 = L.E. 180