NEW-ERA PUBLIC SCHOOL

CLASS: 7th UNIT: 03

SUBJECT: MATHEMATICS SESSION: 2021

SOLVED ASSIGNMENT OF UNIT-III

CHAPTER: LINES AND ANGLES

LESSON NO: 05

Ex. No. :→ 5.1

Complementary angles :→ When the sum of two angles is equal to 90°, then the angles are called complementary angles.

Supplementary angles :→ When the sum of two angles is equal to 180°, then the angles are called supplementary angles.

Q1 :→ **Answer the following questions:**

a) what is the measure of the complement of the angle measuring 20°?

Sol) Complement of the 20° = 90° - 20° = 70°

b) what is the measure of the supplement of the angle measuring 130°?

Sol) Supplement of the angle of 130° = 180° - 130° = 50°

c) what is the measure of the complement of the angle measuring 65°?

Sol) Complement of the angle of 65° = 90° - 65° = 25°

d) If ∠ABC & ∠PQR are supplementary angles & ∠PQR measures 32°. what is the measure of ∠ABC?

Sol) Supplement of ∠PQR of 32° = 180° - 32° = 148°

⇒ ∠ABC is 148°

Q2:→ Two complementary angles are such that the measure of one is thrice the measure of the other. find the measure of the angles?

Sol) let the measure of the smaller angle be x
then, the measure of its complement be $2x$.

Ac. to Q.

$$x + 2x = 90^\circ \quad \text{— [CA].}$$

$$\Rightarrow 3x = 90^\circ$$

$$\Rightarrow x = \frac{90}{3_1}^{30}$$

$$\Rightarrow x = 30^\circ$$

Hence the Ist complement angle $= x = 30^\circ$
then 2nd complement angle $= 2x = 2 \times 30^\circ = 60^\circ$

Q3:→ Two supplementary angles are such that the measure of one angle is $4/5$ of the measure of the other angle. Find the measure of angles.?

Sol) Let the measure of one supplement angle be x
then, the measure of its supplement be $\frac{4}{5}x$

Ac. to Q.

$$\frac{x}{1} + \frac{4}{5}x = 180^\circ \quad \text{— [SA]}$$

$$\Rightarrow \frac{5x + 4x}{5} = 180 \quad \rightarrow \text{[by CM]}.$$

$$\Rightarrow \frac{9x}{5} = 180^\circ$$

$$\Rightarrow x = 180 \div \frac{9}{5}$$

$x = \frac{\cancel{180}^{20} \times 5}{\cancel{9}_{1}}$

$\Rightarrow \quad x = 20 \times 5$

$\Rightarrow \quad x = 100^\circ$

$\therefore$ Ist supplement angle $= x = 100^\circ$

then, 2nd supplement angle $= \frac{4}{5}x$

$= \frac{4}{\cancel{5}_{1}} \times \cancel{100}^{20}$

$= 4 \times 20$

$= 80^\circ$

Q5:→ An angle is equal to its supplement. what is its measure?

Sol) let the measure of angles be x.

its supplement angle be also x.

Ac. to Q.

$x + x = 180^\circ$

$\Rightarrow \quad 2x = 180^\circ$

$\Rightarrow \quad 2x = 180^\circ$

$\Rightarrow \quad x = \frac{\cancel{180}^{90^\circ}}{\cancel{2}_{1}}$

$\Rightarrow \quad x = 90^\circ$

So, each angle is 90°.

Q6:→ write the measure of complement of each:

a) 46°

Sol) $90^\circ - 46^\circ = 44^\circ$

c) 42°

Sol) $90^\circ - 42^\circ = 48^\circ$

e) 61°

Sol) $90^\circ - 61 = 29^\circ$

f) 27°

Sol) $90^\circ - 27^\circ = 63^\circ$

Q7:→ Write the measure of the angle which is supplement of the angle of the following measures:

a) 165°

Sol) $180^\circ - 165^\circ = 15^\circ$

e) 47°

Sol) $180^\circ - 47^\circ = 133^\circ$

c) 142°

Sol) $180^\circ - 142^\circ = 38^\circ$

f) 73

Sol) $180^\circ - 73^\circ = 107^\circ$

Q8:→ Seperate the pairs of complementary and supplementary angles from the following:

a) $81^\circ, 99^\circ$

Sol) $81^\circ + 99^\circ = 180^\circ$ → supplementary angles

b) $45^\circ, 45^\circ$

Sol) $45^\circ + 45^\circ = 90^\circ$ → complementary angles.

d) $30^\circ, 60^\circ$

Sol) $30^\circ + 60^\circ = 90^\circ$ → complementary angles.

g) $90^\circ, 90^\circ$

Sol) $90^\circ + 90 = 180^\circ$ → supplementary angles.

Ex : 5.2

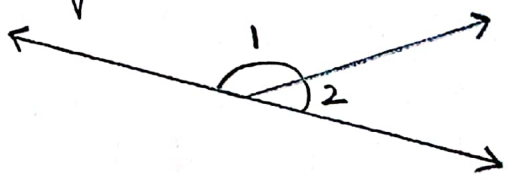
Adjacent Angles:→ The angles having a common arm and a common vertex are called adjacent angles.

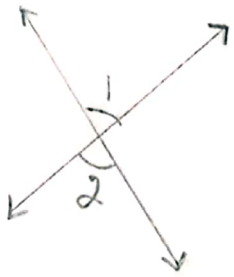
Linear Pair:→ A pair of adjacent angles whose sum is a straight line (180°) is called a linear pair.

Vertically opposite Angles:→ when two lines intersect, the angles that are formed opp. to each other at the pt. of intersection.

Q1:→ Are the angles marked 1 and 2 adjacent? If they are not adjacent angles, Say 'why'?

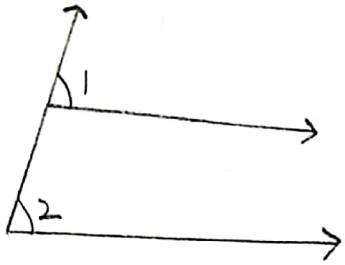
a) They are adjacent angles





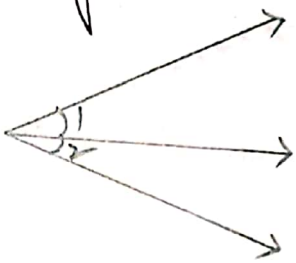
No, They are not adjacent angles because They are not having a common arm

c)



No, They are not adjacent angles because They are not having common arm nor common vertex

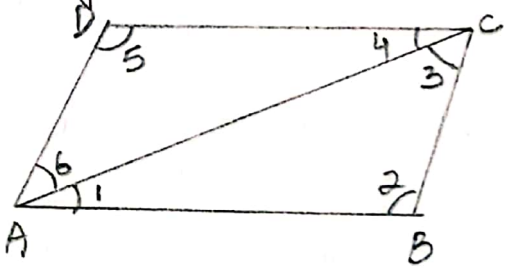
d)



Yes They are adjacent angles.

Q3:→ Write the pairs of adjacent angles.

Sol) $\angle 1$ and $\angle 6$ and $\angle 3$ and $\angle 4$ are pairs of adjacent angles.



Q4:→ Name the angles:

a) Adjacent angles of $\angle BOC$

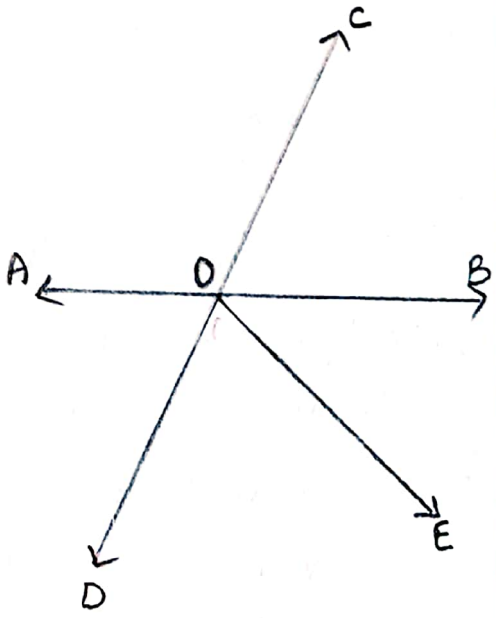
Sol) $\angle BOE$ and $\angle AOC$.

b) Vertically opposite to $\angle AOD$

Sol) $\angle BOC$

c) Forming linear pairs

Sol) $[\angle AOC, \angle COB]$, $[\angle AOD, \angle DOB]$
$[\angle BOE, \angle AOE]$, $[\angle COE, \angle DOE]$
$[\angle COB, \angle DOB]$.

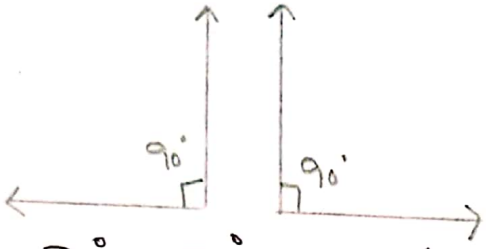


Q5:→ which of the following pairs of angles can form a linear pair when placed adjacent to each other.

a)

Sol) $60^\circ + 100^\circ = 160^\circ$ it's not a linear pair

b)



Sol) $90^\circ + 90^\circ = 180^\circ$ yes, its a linear pair

c)

Sol) $70^\circ + 70^\circ = 140^\circ$ it's not a linear pair

Q6:→ If $\angle 1 = 40^\circ$, what are measures of $\angle 2$ and $\angle 3$?

Sol) $\angle 1 = 40^\circ$

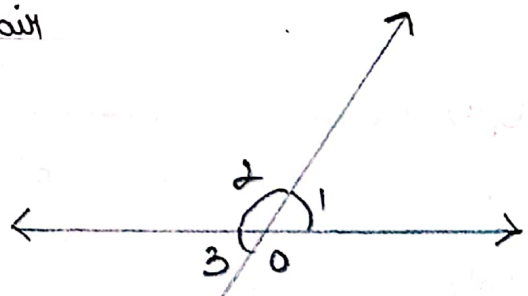
$\because$ $\angle 1$ and $\angle 2$ form a linear pair

$\therefore$ $\angle 1 + \angle 2 = 180^\circ$

$\Rightarrow$ $40^\circ + \angle 2 = 180^\circ$

$\Rightarrow$ $\angle 2 = 180^\circ - 40^\circ$

$\Rightarrow$ $\angle 2 = 140^\circ$



also $\angle 1 = \angle 3$ —vertically opposite $\angle$s.

$\Rightarrow$ $\angle 3 = 40^\circ$

Q8:→ Find the value of x, y and z in each of the following figures:

a

Sol) $\because$ x and 35° form a linear pair

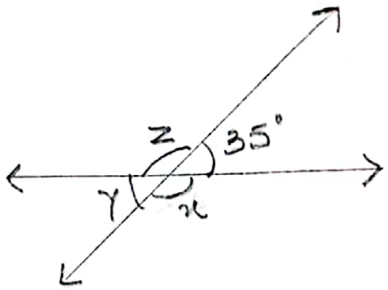
$\therefore$ $x + 35^\circ = 180^\circ$

$\Rightarrow$ $x = 180^\circ - 35^\circ$

$\Rightarrow x = 145^\circ$

also $x = z$ — vertically opp. $\angle$s

$\Rightarrow z = 145^\circ$



also $y = 35^\circ$ — vertically opp. $\angle$s

$\Rightarrow x = 145, y = 35^\circ, z = 145^\circ$

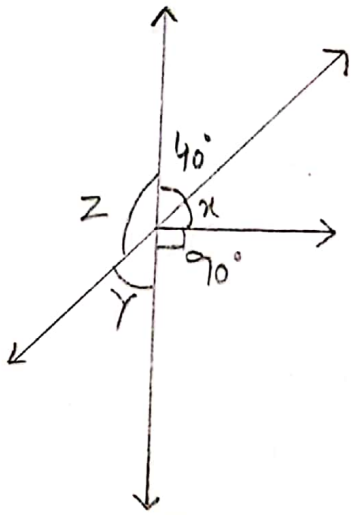
b) $\because 40^\circ$, x and 90° form a linear pair

$\because 40^\circ + x + 90^\circ = 180^\circ$

$\Rightarrow 130^\circ + x = 180^\circ$

$\Rightarrow x = 180^\circ - 130^\circ$

$\Rightarrow x = 50^\circ$



also $y = 40^\circ$ — vertically opp. $\angle$s

also y and z form a linear pair

$\Rightarrow y + z = 180^\circ$

$\Rightarrow 40^\circ + z = 180^\circ$

$\Rightarrow z = 180^\circ - 40^\circ$

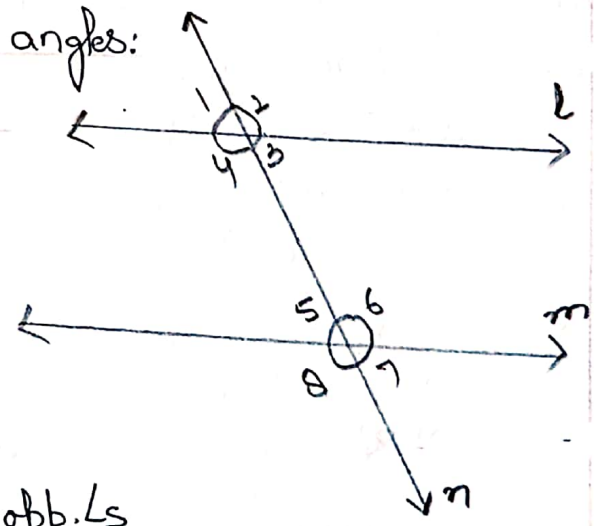
$\Rightarrow z = 140^\circ$

$\Rightarrow x = 50^\circ, y = 40^\circ$ and $z = 140^\circ$

Ex. No :- 5.3

Q1: l is parallel to m, n is transversal and $\angle 1 = 50^\circ$. find the measure of other given angles:

Sol) we have $\angle 1 = 50^\circ$



$\because \angle 1$ and $\angle 2$ form a linear pair

$\because \angle 1 + \angle 2 = 180^\circ$

$\Rightarrow 50^\circ + \angle 2 = 180^\circ$

$\Rightarrow \angle 2 = 180^\circ - 50^\circ$

$\Rightarrow \angle 2 = 130^\circ$

also $\angle 2 = \angle 4$ — vertically opp. $\angle$s

$\Rightarrow \angle 4 = 130^\circ$

also $\angle 1 = \angle 3$ — vertically opp. $\angle$s

$\Rightarrow \angle 3 = 50^\circ$

also $\angle 3 = \angle 5$ — alternative interior angles.

$\Rightarrow \angle 5 = 50^\circ$

also $\angle 4 = \angle 6$ — alternative int. $\angle$s

$\Rightarrow \angle 6 = 130^\circ$

also $\angle 5 = \angle 7$ — vertically opp. $\angle$s

$\Rightarrow \angle 7 = 50^\circ$

also $\angle 6 = \angle 8$ — vertically opp. $\angle$s

$\Rightarrow \angle 8 = 130^\circ$

Q2: PQ // BC. Find the value of x.

Sol) $\because$ PQ // BC

$\Rightarrow \angle BAP = 60^\circ$ — alternative $\angle$s

and $\angle CAQ = 55^\circ$ — alternative $\angle$s.

Now $\angle BAP$, $\angle BAC$ and $\angle CAQ$ form a linear pair

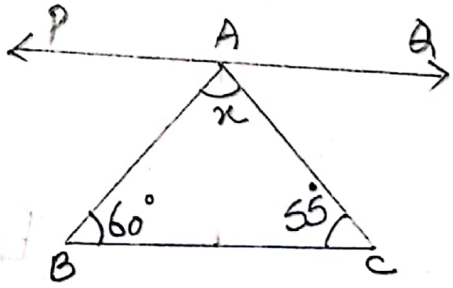
$\therefore \angle BAP + \angle BAC + \angle CAQ = 180^\circ$

$60^\circ + x + 55^\circ = 180^\circ$

$\Rightarrow 115^\circ + x = 180^\circ$

$\Rightarrow x = 180^\circ - 115^\circ$

$\Rightarrow x = 65^\circ$



Q4: l // m, Find the unknown angles.

Sol) l // m and t is a Transversal.

$\because a + 72^\circ = 180^\circ$ — linear pair

$\Rightarrow a = 180^\circ - 72^\circ$

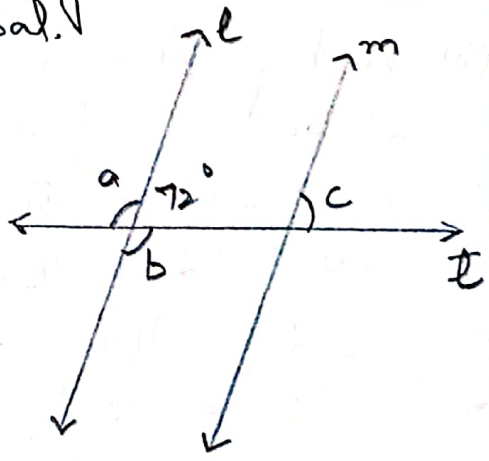
$\Rightarrow a = 108^\circ$

also $a = b$ — vertically opp. $\angle$s

$\Rightarrow b = 108^\circ$

also $72^\circ = c$ — corresponding $\angle$s

$\Rightarrow c = 72^\circ$



CHAPTER :→ PERIMETER AND AREA

LESSON NO :→ 11

Ex: 11.1

NOTE :→

1) Area of Square = $(side)^2$
2) Perimeter of Square = $4(side)$.
3) Area of rectangle = length × breadth
4) Perimeter of rectangle = $2[length + breadth]$.

Q1) Find the Area of Square whose Perimeter is 40cm?

Sol) Perimeter of Square = 40cm

$\Rightarrow$ $4 \times side = 40cm$

$\Rightarrow$ $side = \frac{40cm}{4}$ 10

$\Rightarrow$ $side = 10cm$

Now, Area of Square = $(Side)^2$

$= side \times side$

$= 10cm \times 10cm$

$= 100\ cm^2$.

Q2:→ Find the Perimeter of a Square whose area is 25 sq. cm.?

Sol) Area of Square = $25cm^2$

$\Rightarrow$ $(side)^2 = 25cm^2$

$\Rightarrow$ $(side)^2 = (5cm \times 5cm)$

$\Rightarrow$ $(side)^2 = (5cm)^2$

$\Rightarrow$ $side = 5cm$.

Now, Perimeter of Square = $4\,side$

$= 4 \times 5cm$

$= 20cm$.

Q3) Determine the area of a rectangle whose length is 16cm & perimeter is 48cm?

Sol) length of rectangle = 16cm

breadth = b

Perimeter of rect. = $2[l+b]$

$\Rightarrow$ $2[l+b] = 48\,cm$

$\Rightarrow$ $2[16 + b] = 48cm$

$\Rightarrow$ $2(16) + 2b = 48cm$.

Q5:→ Find the cost of lamination of photograph of size 60cm × 35cm at the rate of 2 per 100 cm square.

Sol) length of photograph = 60cm

breadth = 35cm

$\therefore$ Area of photograph = $l \times b$

$= 60cm \times 35cm$

$= 2100\ cm^2$

$\Rightarrow 32 + 2b = 48cm$

$\Rightarrow 2b = 48 - 32$

$\Rightarrow 2b = 16cm$

$\Rightarrow b = \frac{16cm}{2}$

$\Rightarrow b = 8cm$

Now, Area of rect. $= l \times b$

$= 16cm \times 8cm$

$= 128cm^2$

Now, Cost of lamination per $100\ cm^2 = ₹\ 2$

$\therefore$ Cost of lamination $1cm^2 = \frac{2}{100}$

$\therefore$ Total cost of lamination $=$

$= \frac{2}{100} \times 2100$

$= 2 \times 21$

$= ₹\ 42$

Q7:→ The length & breadth of a rectangular field are in the ratio 3:2. If the area of the field is 3456 Sq.m. find the cost of fencing the field at ₹ 4 per. meter. ?

Sol) let the length of field $= 3x$ & breadth $= 2x$.

Now Area of field $= 3456\ m^2$

$\Rightarrow l \times b = 3456m^2$

$\Rightarrow 3x \times 2x = 3456m^2$

$\Rightarrow 6x^2 = 3456m^2$

$\Rightarrow x^2 = \frac{3456m^2}{6}$ 576

$\Rightarrow x^2 = 576\ m^2$

$\Rightarrow x^2 = 24m \times 24m$

$\Rightarrow x^2 = (24m)^2$

Q10:→ The area of a square plot is 6084 sq.m. find the length of the wire which can go three times along the boundary of the plot ?

Sol) Area of plot $= 6084\ m^2$

$\Rightarrow (side)^2 = 6084\ m^2$

$\Rightarrow (side)^2 = 78m \times 78m$

$\Rightarrow (side)^2 = (78m)^2$

$\Rightarrow side = 78m.$

Now perimeter of plot $= 4 side$

$= 4 \times 78m$

$= 312m$

Now length of wire that go three time along boundary

$= 3 \times 312m$

$= 936\ m$

$x = 24m$.

Length of plot $= 3x$

$= 3 \times 24m$

$= 72m$

Breadth of plot $= 2x$

$= 2 \times 24m$

$= 48m$

Now, Perimeter of plot $= 2[l+b]$

$= 2[72m + 48m]$

$= 2[120m]$

$= 240m$

$\therefore$ Cost of fencing $= ₹4 \times 240$

$= ₹960$

Q14:→ The floor of a room is of dimensions 4m x 6m. Tiles of size 10cm x 12cm have to lay on it. How many tiles are reqd. to cover the floor?

Sol) Length of room $= 4m$

$= 4 \times 100\ cm$

$= 400\ cm$

Breadth of room $= 6m$

$= 6 \times 100\ cm$

$= 600\ cm$

$\therefore [1m = 100cm]$

Now Area of room $= l \times b$

$= 400cm \times 600cm$

$= 240000\ cm^2$

Now length of tile $= 10cm$

breadth $= 12cm$

$\therefore$ Area of tile $= l \times b$

$= 10cm \times 12cm$

$= 120\ cm^2$

$\therefore$ No. of tiles reqd. $=$

$$\frac{\text{Area of room}}{\text{Area of tile}}$$

$$= \frac{240000\ cm^2}{120\ cm^2} \times 2000$$

$= 2000$ tiles

$\therefore$ No. of tiles reqd. to cover the floor is 2000.

Ex : 11.2

Q1 :→ Find the area of the path whose width is 2m and which runs around out side a square field of side 40m.

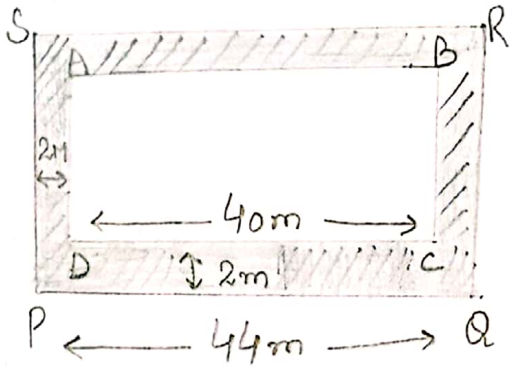
Sol) let ABCD represents the square field with side 40m

∴ Area of square ABCD = $(side)^2$

= side × side

= 40m × 40m

= 1600 m^2



Now length of field including path

= 40m + 2m + 2m

= 44m

∴ Now Area of square including path = $(side)^2$

⇒ Area of PQRS = side × side

= 44m × 44m

= 1936 m^2

∴ Area of path = Area of PQRS − Area of ABCD

= 1936 m^2 − 1600 m^2

= 336 m^2.

Q3 :→ A carpet measures 24m by 16m. A strip of 2m wide is cut from it all around. Find the area of the remaining carpet & also the area of the strip cut out ?

Sol) let ABCD represents the carpet with

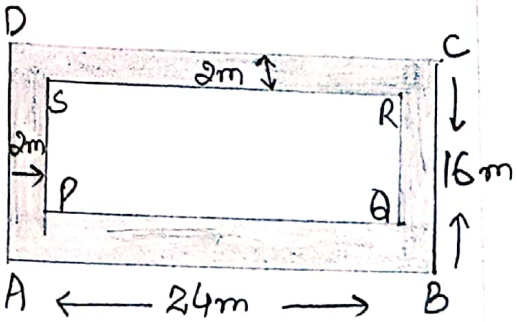
length = 24m

breadth = 16m

∴ Area of carpet ABCD = l × b

= 24m × 16m

= 384 m^2



Now length of carpet without strip

= 24 − (2m + 2m)

PQ = 24m - 4m = 20m

breadth QR = 16m - (2m + 2m)

= 16m - 4m = 12m.

Now, Area of carpet with out strips PQRS = l x b

= 20m x 12m

= 240m².

∴ Area of strip (shaded portion = Area of ABCD - Area of PQRS

= 384m² - 240m²

= 144m²

Q5:→ A painting of dimensions 40cm x 30cm is framed with a silk border of width 4 cm on all its sides. find the area of the silk used. & also the total area of framed painting?

Sol) let ABCD represents the painting with

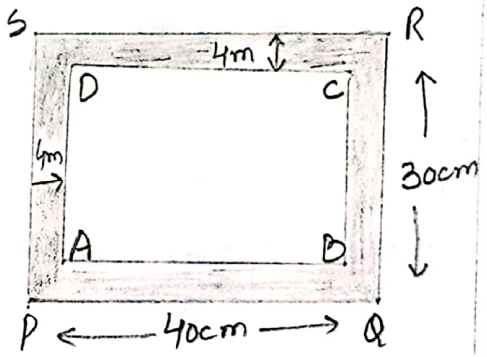
with length = 40cm

& breadth = 30cm

∴ Area of painting ABCD = l x b

= 40cm x 30cm

= 1200 cm²



Now length of painting with border PQ = 4cm + (4cm + 4cm)

= 4cm + 8cm = 48cm

Breadth = 30cm + 8cm = 38cm

Now Area of painting with border PQRS = l x b

= 48cm x 38cm

= 1824 cm²

∴ Total area of framed painting = 1824cm²

Now Area of silk border = Area of PQRS - Area of ABCD

= 1824cm² - 1200 cm²

= 624 cm².

Note:→[Practice the remaining questions by using same method]

Ex: 11.3

Note :⇒

1) Area of Triangle = $\frac{1}{2}$ × base × corresponding altitude
2) Area of an equilateral Triangle = $\frac{\sqrt{3}}{4}a^2$.

Q1:⇒ Find the area of a △ whose base is 40cm & the corresponding altitude is 12cm long ?

Sol) Base = 40cm
Altitude = 12cm

∴ Area of △ = $\frac{1}{2}$ × base × altitude
= $\frac{1}{2}$ × 40cm × 12cm
= 40cm × 6cm
= 240 cm^2

Q2:⇒ The area of an equilateral Triangle is $81\sqrt{3}$ sq.cm. Find the perimeter of the △?

Sol) Area of △ = $81\sqrt{3}\,cm^2$

$\frac{\sqrt{3}}{4}a^2 = 81\sqrt{3}\,cm^2$

$\Rightarrow a^2 = 81\sqrt{3} \times \frac{4}{\sqrt{3}}\,cm^2$

$\Rightarrow a^2 = 9 \times 9 \times 2 \times 2\,cm^2$

$\Rightarrow a^2 = (9 \times 2cm)^2$

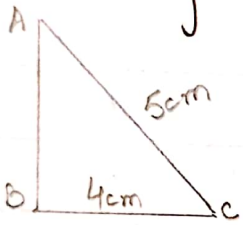
$\Rightarrow a^2 = (18cm)^2$

$\Rightarrow a = 18cm.$

∴ Side of eq. Triangle = 18cm
∴ perimeter of △ = 3 side
= 3 × 18cm
= 54cm.

Q4:⇒ The base of a rt-angled Triangle is 4cm & the hypotenuse is 5cm. Find the area of the △?

Sol)



Let ABC be a rt. angled △. with Base = 4cm
& Hypotenuse AC = 5cm
Using pythagores theorem
$(Hyp)^2 = (Base)^2 + (per)^2$

Q5:⇒ The base of a triangle is 23cm long & its area is 161 sq. cm. Find the length of the corresponding altitude.?

Sol) Base = 23cm
Area of △ = $161\,cm^2$

$(AC)^2 = (BC)^2 + (AB)^2$

$(5cm)^2 = (4cm)^2 + (AB)^2$

$25cm^2 = 16cm^2 + (AB)^2$

$\Rightarrow (AB)^2 = 25cm^2 - 16cm^2$

$\Rightarrow (AB)^2 = 9cm^2$

$\Rightarrow (AB)^2 = (3cm \times 3cm)$

$\Rightarrow (AB)^2 = (3cm)^2$

$\Rightarrow AB = 3cm.$

$\therefore$ altitude of $\Delta = 3cm$

$\therefore$ Area of $\Delta = \frac{1}{2} \times B \times A$

$= \frac{1}{2} \times 4cm \times 3cm$

$= 2cm \times 3cm$

$= 6cm^2$

Q9:→ In a Triangle, if the length of altitude is double of its base & the area is 400 sq.cm. find the length of base & altitude?

Sol) Let the base of Δ be x

then, altitude be $2x$.

Now Area of $\Delta = 400cm^2$

$\Rightarrow \frac{1}{2} \times b \times alt. = 400cm^2$

$\Rightarrow \frac{1}{2} \times x \times 2x = 400cm^2$

$\Rightarrow x^2 = 400cm^2$

$\Rightarrow x^2 = 20cm \times 20cm$

$\Rightarrow x^2 = (20cm)^2$

$\Rightarrow x = 20cm.$

$\therefore$ base $= x = 20cm.$

altitude $= 2x \Rightarrow 2 \times 20cm = 40cm$

$\Rightarrow \frac{1}{2} \times base \times altitude = 161cm^2$

$\Rightarrow \frac{1}{2} \times 23cm \times altitude = 161cm^2$

$\Rightarrow \frac{23}{2} cm \times altitude = 161cm^2$

$\Rightarrow altitude = 161cm^2 \div \frac{23cm}{2}$

$\Rightarrow altitude = \frac{161}{7} cm^2 \times \frac{2}{23cm}$

$\Rightarrow altitude = 7cm \times 2$

$= 14cm.$

$\therefore$ altitude $= 14cm.$

Q10:→ PQR is an isosceles Δ in which the base QR is 16cm & each side PQ & PR is 10cm. find the area of Δ PQR.?

Sol) In Δ PQR.

$PQ = PR = 10cm$

& QR is $= 16cm.$

Draw a perpendicular PD from P to QR.

Now in rt. Δ PQD.

Using pythagoras theorem.

$(Hyp)^2 = (Base)^2 + (Per)^2$

$(PQ)^2 = (QD)^2 + (PD)^2$

$(10cm)^2 = (8cm)^2 + (PD)^2$

$100cm^2 = 64cm^2 + (PD)^2$

$\Rightarrow (PD)^2 = 100cm^2 - 64cm^2$

$\Rightarrow (PD)^2 = 36cm^2$

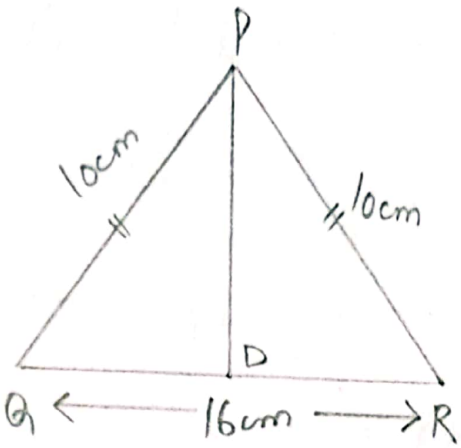


figure of Q:10

$\Rightarrow (PD)^2 = 6cm \times 6cm$

$\Rightarrow (PD)^2 = (6cm)^2$

$\Rightarrow PD = 6cm.$

Now Area of $\triangle PQR$ =

$= \frac{1}{2} \times base \times altitude$

$= \frac{1}{2} \times QR \times PD$

$= \frac{1}{2_1} \times 16cm \times \overset{3}{6}cm$

$= 16cm \times 3cm$

$= 48cm^2$

Ex : 11.4

NOTE :→

Area of parallelogram = base × corresponding altitude.

Q1:→ One side of parallelogram is 20cm long & the corresponding altitude is 14cm long. Find the area of the parallelogram ?

Sol) Base = 20cm.

altitude = 14cm

∴ Area of parallelogram

= base × altitude

= 20cm × 14cm

= $280cm^2$

Q2:→ Area of the parallelogram ABCD is 225 sq. cm. If its altitude is 10cm long, find the length of the corresponding base of the parallelogram ?

Sol) Altitude = 10cm.

Area of parallelogram = $225cm^2$

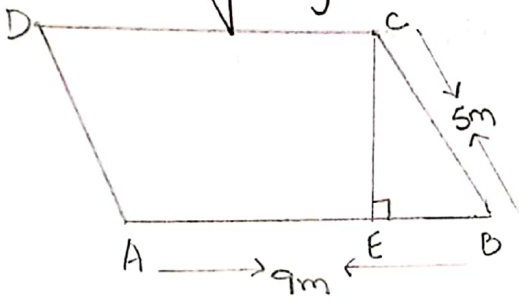
$\Rightarrow$ base × altitude = $225cm^2$

$\Rightarrow$ base × 10cm = $225cm^2$

$\Rightarrow$ base = $\frac{225cm^2}{10cm}$

$\Rightarrow$ base = 22.5cm

Q:→ ABCD is a parallelogram, AB = 9m, BC = 5cm & CE is perpendicular to AB. If the area of parallelogram is 36 sq.cm, find the length of EB.



Sol) Base of ||gram = 9m.
Area of ||gram = 36cm²
base × altitude = 36cm²
9cm × altitude = 36cm²
⇒ altitude = $\frac{36\text{cm}^2}{9\text{cm}}$
⇒ altitude = 4cm.
Now in rt. △ CEB.
Using pythagoras theorem.
(Hyp)² = (Base)² + (Per)²
(CB)² = (EB)² + (CE)²
(5cm)² = (EB)² + (4cm)²
25cm² = (EB)² + 16cm²
⇒ (EB)² = 25cm² − 16cm²
⇒ (EB)² = 9cm²
⇒ (EB)² = 3cm × 3cm
⇒ (EB)² = (3cm)²
⇒ EB = 3cm.

Q4:→ The floral design on the floor of a building consists of 2600 tiles. Each tile is in the shape of a parallelogram of altitude 3cm long & base 5cm long. Find the cost of polishing the design at the rate of ₹ 150 per square meter.

Sol) Total no. of tiles = 2600
Base of tile = 5cm.
altitude of tile = 3cm.
∴ Area of 1 tile = b × alt.
= 5cm × 3cm
= 15cm².
∴ Area of 2600 tiles =
= 2600 × 15cm²
= 39000 cm².
Now, we know.
10000 cm² = 1m²
⇒ 1cm² = $\frac{1}{10000}$ m²
⇒ 39000cm² = $\frac{1}{10000}$ × 39000m²
= $\frac{39}{10}$ m² or
= 3.9m²
Now cost of polishing
1m² = ₹ 150.

Q5:→ In a parallelogram, the length of the altitude is twice the length of the base. its area is $450\ cm^2$. find the length of the base & of the altitude?

Sol) let base of a parallelogram be x.

then, altitude $= 2x$.

Now, Area of parallelogram = base × altitude.

$\Rightarrow 450cm^2 = x \times 2x$

$\Rightarrow 450\ cm^2 = 2x^2$

or $2x^2 = 450\ cm^2$

$\Rightarrow x^2 = \frac{450}{2}\ cm^2$ (225)

$\Rightarrow x^2 = 225cm^2$

$\Rightarrow x^2 = 15cm \times 15cm$

$\Rightarrow x^2 = (15cm)^2$

$\Rightarrow x = 15cm$

$\therefore$ Base $= x = 15cm$

altitude $= 2x$

$= 2 \times 15cm$

$= 30\ cm.$

$\therefore$ Total cost of polishing $=$

$= \frac{39}{10} \times 150$

$= 39 \times 15$

$= ₹\ 585$

Q8:→ The height of a //gram is one third of its base. If the area of the //gram is $108\ cm^2$. find the length of its base & altitude.

Sol) let base of //gram $= x$

then altitude $= \frac{1}{3}x$.

$\therefore$ Area of //gram $= 108\ cm^2$

$\Rightarrow$ base × altitude $= 108cm^2$

$\Rightarrow x \times \frac{x}{3} = 108cm^2$

$\Rightarrow \frac{x^2}{3} = 108cm^2$ — by cm

$\Rightarrow x^2 = 108cm^2 \times 3$

$\Rightarrow x^2 = 2 \times 2 \times 3 \times 3 \times 3 \times 3\ cm^2$

$\Rightarrow x^2 = (2 \times 3 \times 3cm)^2$

$\Rightarrow x^2 = (18cm)^2$

$\Rightarrow x = 18cm.$

$\therefore$ Base $= x = 18cm.$

altitude $= \frac{1}{3}x$

$= \frac{1}{3} \times 18cm$ (6)

$= 6cm.$

Ex : 11.5

NOTE :→

1) Area of circle $= \pi r^2$
2) Circumference of circle $= 2\pi r$.
3) Diameter $= 2 \times$ radius.
4) Radius $= \frac{\text{Diameter}}{2}$.

Q2:→ Find the circumference of a circle of radius 5cm. Take $\pi = 3.14$.

Sol) radius $= 5$cm.

circumference of circle $= 2\pi r$
$= 2 \times 3.14 \times 5$cm
$= 10 \times 3.14$ cm
$= 31.40$ cm

Q3:→ What is the circumference of a circular plate of radius 10.5cm. Take $\pi = 3.14$

Sol) radius $= 10.5$cm

circumference $= 2\pi r$
$= 2 \times 3.14 \times 10.5$cm
$= 6.28 \times 10.5$cm
$= 65.940$ cm

Q4:→ A piece of wire in the form of a rectangle with dimensions 12m by 10m is reshaped to form a circle. Find the diameter of circle. ?

Sol) length of rectangle $= 12$m
breadth $= 10$m

$\therefore$ perimeter of rectangle $= 2[l+b]$
$= 2[12\text{m} + 10\text{m}]$
$= 2(22\text{m})$
$= 44$m

Now, perimeter of rectangle = circumference of circle

$\Rightarrow 44\text{m} = 2\pi r$

Q6:→ A track is in the form of a ring whose inner and outer circumference are 55m & 132m resp. Find the width of the track ?

Sol) let radius of outer track be R.

$\therefore$ circumference of outer track $= 132$m

$2\pi R = 132$ m

$\Rightarrow 2 \times \frac{22}{7} \times R = 132$ m

$\Rightarrow \frac{44}{7} \times R = 132$m

$\Rightarrow R = \frac{\cancel{132}^{3}\text{m} \times 7}{\cancel{44}_{1}}$

or $2\pi r = 44m$

$\Rightarrow 2 \times \frac{22}{7} \times r = 44m$

$\Rightarrow \frac{44}{7} \times r = 44m$

$\Rightarrow r = 44m \div \frac{44}{7}$

$\Rightarrow r = \cancel{44}m \times \frac{7}{\cancel{44}}$

$\Rightarrow r = 7m$

$\therefore$ Diameter = 2 radius

$= 2 \times 7m$

$= 14m$

$\Rightarrow R = 3m \times 7 = 21m.$

Now, let radius of inner track be r

circumference of inner track = 55m

$\Rightarrow 2\pi r = 55m$

$\Rightarrow 2 \times \frac{22}{7} \times r = 55m$

$\Rightarrow \frac{44}{7} \times r = 55m$

$\Rightarrow r = \frac{\cancel{55}^{5} \times 7}{\cancel{44}_{4}}$

$\Rightarrow r = \frac{5 \times 7}{4}$

$\Rightarrow r = \frac{35}{4}m = 8.75m$

Now, width of track = R − r

$= 21m - 8.75m$

$= 12.25m$

Ex : 11.6

Q1) Find the area of the following circles, given that

a) Radius = 14cm

Take $\pi = 22/7$

Sol) radius = 14cm

$\therefore$ Area of circle $= \pi r^2$

$= \pi (14cm)^2$

$= \frac{22}{\cancel{7}_{1}} \times 14cm \times \cancel{14}^{2}cm$

$= 22 \times 14cm \times 2cm$

$= 44 \times 14cm$

$= 616\ cm^2$

c) Diameter = 35cm

Take $\pi = 3.14$

Sol) diameter = 35cm

$\therefore$ radius $= \frac{D}{2} = \frac{35}{2}cm$

$= 17.5cm$

$\therefore$ Area of circle $= \pi r^2$

$= 3.14 \times (17.5cm)^2$

$= 3.14 \times 17.5cm \times 17.5cm$

$= 3.14 \times 306.25\ cm^2$

$= 961.625\ cm^2$

Q3:→ If the circumference of a circular sheet is 154cm, find its radius. Also, find the area of the sheet ($\pi = 22/7$)

Sol) Circumference of Sheet = 154cm

$\Rightarrow 2\pi r = 154\text{cm}$

$\Rightarrow 2 \times \frac{22}{7} \times r = 154\text{cm}$

$\Rightarrow \frac{44}{7} \times r = 154\text{cm}$

$\Rightarrow r = \frac{154\text{cm} \times 7}{44}$

$\Rightarrow r = \frac{7\text{cm} \times 7}{2}$

$\Rightarrow r = \frac{49}{2}\text{cm} = 24.5\text{cm}$

$\therefore$ Area of circle $= \pi r^2$

$= \frac{22}{7} \times \left(\frac{49}{2}\text{cm}\right)^2$

$= \frac{22}{7} \times \frac{49}{2} \times \frac{49}{2}\text{cm}^2$

$= \frac{77 \times 49}{2}\text{cm}^2$

$= \frac{3773}{2}\text{cm}^2$

$= 1886.5\text{cm}^2$

$\therefore$ Area of circle is 1886.5cm^2

Q4:→ From a square sheet of each side 7cm a circle of radius 3.5cm is removed from the centre of the square sheet. Find the area of the remaining sheet?

Sol) Side of Square = 7cm

$\therefore$ Area of Square $= (\text{side})^2$

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

$= 7\text{cm} \times 7\text{cm}$

$= 49\text{cm}^2$.

Now Radius of Circle = 3.5cm

$\therefore$ Area of Circle $= \pi r^2$

$= 3.14 \times (3.5\text{cm})^2$

$= 3.14 \times (3.5\text{cm} \times 3.5\text{cm})$

$= 3.14 \times 12.25\text{cm}^2$

$= 38.4650\text{cm}^2$

Now, Area of remaining sheet = Area of Square − Area of Circle

$= 49\text{cm}^2 - 38.4650\text{cm}^2$

$= 10.5350\text{cm}^2$

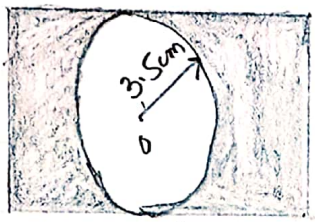
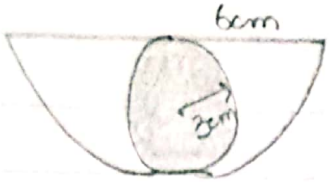


fig of Q no: 4.

Q6:→ A circle is inscribed in a semi-circle of radius 6cm, find the area of shaded portion (Take $\pi = 3.14$)



Sol) Radius of semi-circle = 6cm.

$\therefore$ Area of semi-circle $= \frac{\pi r^2}{2}$

$= \frac{3.14 \times (6cm)^2}{2}$

$= \frac{3.14 \times 6cm \times \cancel{6}^{3}cm}{\cancel{2}_{1}}$

$= 3.14 \times 18cm^2$

$= 56.52cm^2$.

Now, diameter of inscribed circle = 6cm

$\Rightarrow$ Radius of inscribed circle $= \frac{d}{2} = \frac{\cancel{6}^{3}cm}{\cancel{2}_{1}} = 3cm$

Now, Area of inscribed circle $= \pi r^2$

$= 3.14 \times (3cm)^2$

$= 3.14 \times 3cm \times 3cm$

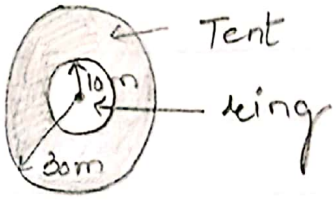
$= 3.14 \times 9cm^2$

$= 28.26cm^2$

$= 0 =$

Q7:→ A circus tent has a radius of 30m. The ring at its centre for the performance is of 10m of radius. Find the area left for audience (Take $\pi = 3.14$)

Sol)



Radius of tent = 30m.

$\therefore$ Area of tent $= \pi r^2$

$= 3.14 \times (30m)^2$

$= 3.14 \times 30m \times 30m$

$= 3.14 \times 900\ m^2$

$= 2826.00\ m^2$

Now radius of ring = 10m

$\therefore$ Area of ring $= \pi r^2$

$= 3.14 \times (10m)^2$

$= 3.14 \times 10m \times 10m$

$= 3.14 \times 100\ m^2$

$= 314\ m^2$

$\therefore$ Area left for audience = Area of tent − Area of ring

$= 2826.00m^2 - 314\ m^2$

$= 2512\ m^2$

NOTE:→

Area :→ The space occupied by the surface of an object.

Perimeter :→ The perimeter is the distance around the object.