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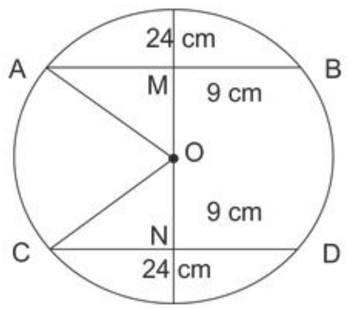
Class: EM - CLASS 9 **Subject:** Mathematics - Part 2 (Geometry) **Time:**1 hrs
Date: 24-12-2024 **Paper:** Unit 2 (Solution) **Marks:**20

Q1)
(1) 18 cm
(2) concentric circles
(3) Parallel to X - axis
(4) 4.5 cm

Q2(A))
(1) (1) seg OP ⊥ chord AB (2) seg OP (3) radii of the same circle (4) c.s.c.t
(2) (1) Angle of rectangle (2) Pythagoras theorem (3) 242 + 72 (4) 625 (5) 25 cm

(B))
(1)

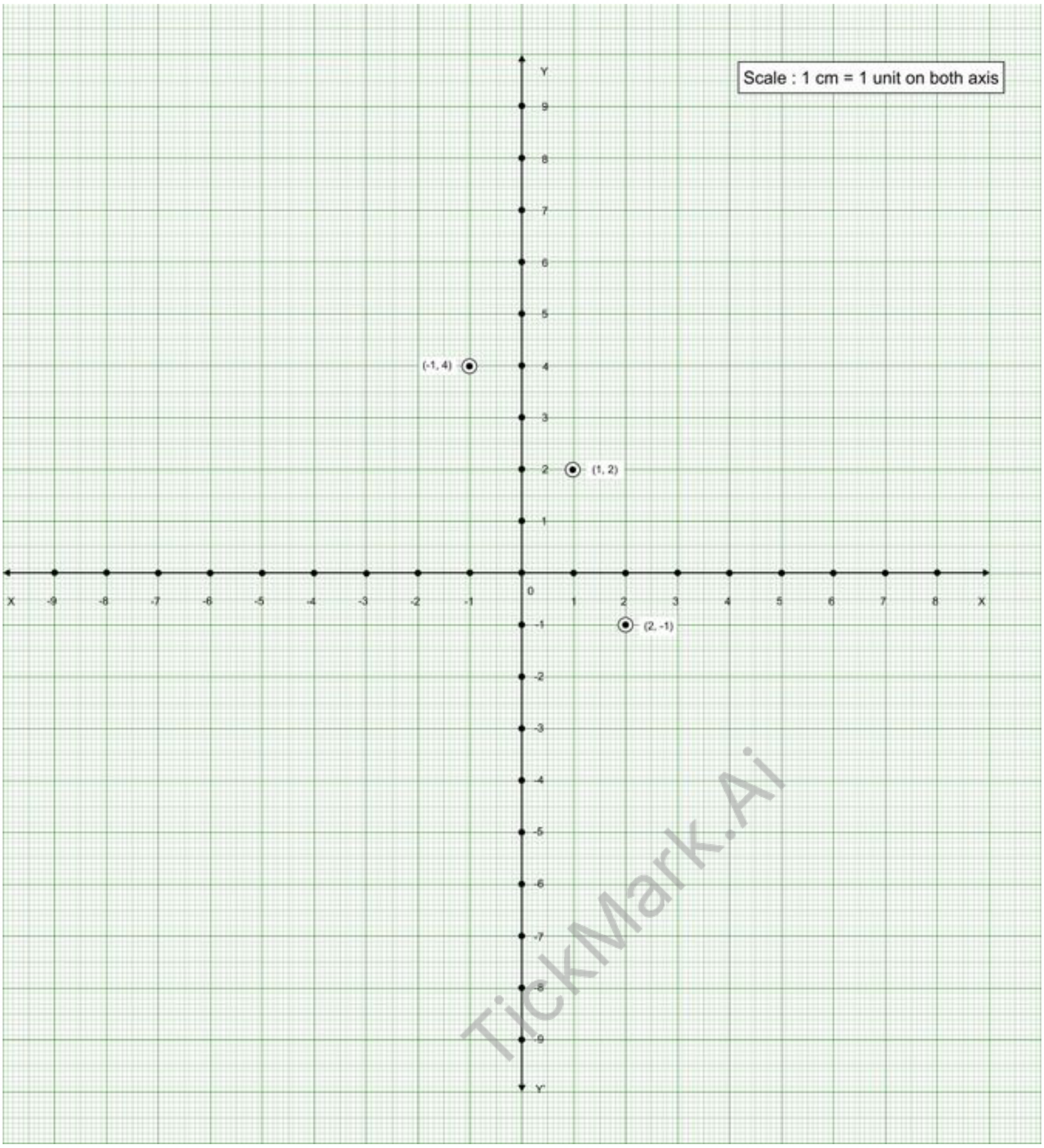


In circle, with center O
chord AB = chord CD = 24 cm ...(Given)
and OM = ON = 9 cm ... (Given)
AM = $\frac{1}{2}$ × AB ...(Perpendicular drawn from centre to the chord bisect the chord)

AM = $\frac{1}{2}$ × 24

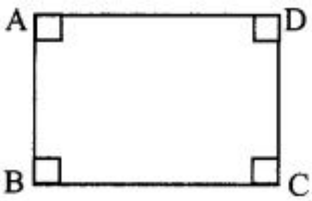
AM = 12 cm

In △AMO,
m∠AMO = 90°
By Pythagoras theorem
$(AO)^2 = (AM)^2 + (MO)^2$
∴ $(AO)^2 = (12)^2 + (9)^2$
∴ $(AO)^2 = 144 + 81$
∴ $(AO)^2 = 225$
∴ AO = 15 cm
∴ Radius of circle is 15 cm.
(2)



These points are not collinear.

(3)



Given: ☐ABCD is a rectangle.

To Prove: Rectangle ABCD is a parallelogram.

Solution:

Let ☐ABCD be a rectangle

$\therefore \angle A \cong \angle B \cong \angle C \cong \angle D = 90°$ ...(Each angle of a rectangle is right angle)

$\therefore \angle A \cong \angle C$ and $\angle D \cong \angle B$

Since opposite angles of a rectangle are congruent. Hence, every rectangle is a parallelogram.

Q3)

(1) $3x - y = 0$

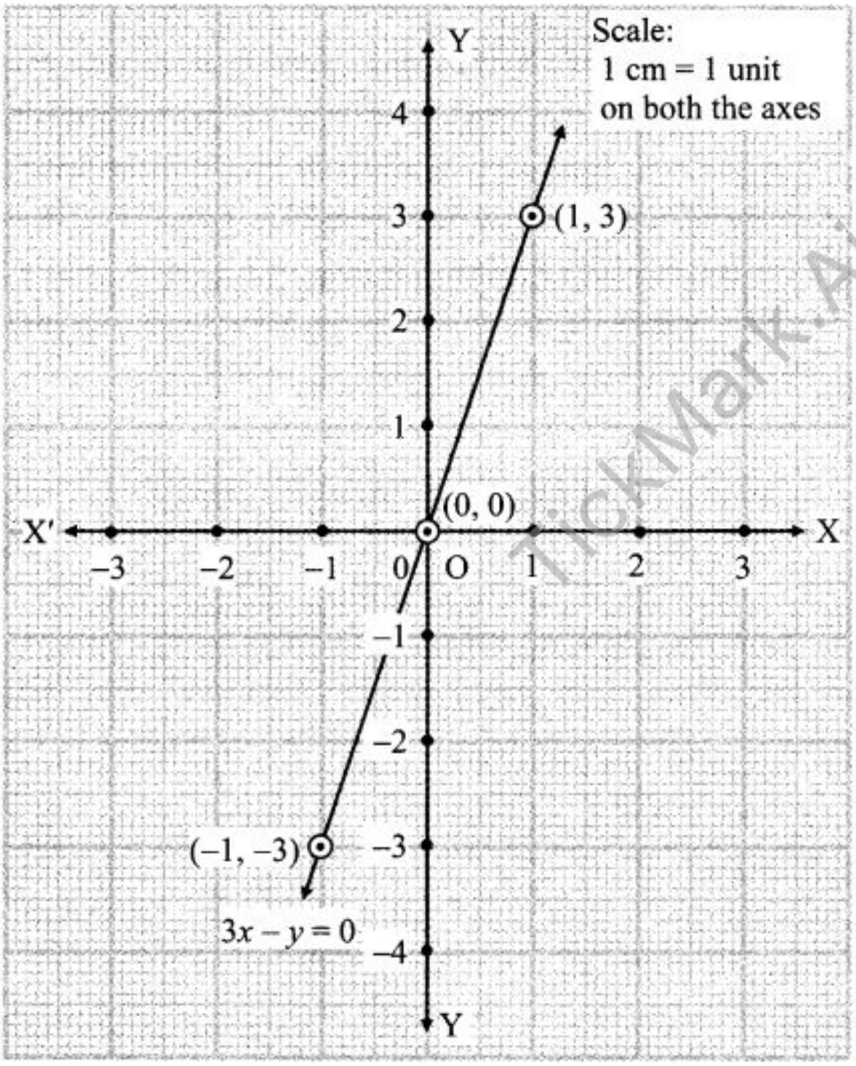
$\therefore y = 3x$

When $x = 0$,

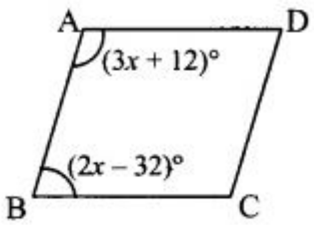
$y = 3x$

= 3(0)
= 0
When x = 1,
y = 3x
= 3(1)
= 3
When x = -1,
y = 3x
= 3(-1)
= -3

x	0	1	-1
y	0	3	-3
(x , y)	(0 , 0)	(1 , 3)	(-1 , -3)



(2)



ABCD is a parallelogram
∴ AD ∥ BC ... (Given)

$\therefore \angle A + \angle B = 180°$ ... (Adjacent angles of a parallelogram are supplementary)

$\therefore 3x + 12 + 2x - 32 = 180°$ ... (Given)

$\therefore 5x - 20 = 180°$

$5x = 200°$

$x = \frac{200}{5}$

$\therefore x = 40°$

$\angle A = 3x + 12 = 3 \times 40 + 12 = 132°$ ... (1)

$\angle B = 2x - 32 = 2 \times 40 - 32 = 48°$ ... (2)

$\angle A = \angle C$ ... (Opposite angles of a parallelogram are congruent)

$\angle B = \angle D$ ... (3) (Opposite angles of a parallelogram are congruent)

$\therefore \angle C = 132°$ ... (From 1 and 3)

$\therefore \angle D = 48°$

(3) Given: In a circle with centre A,

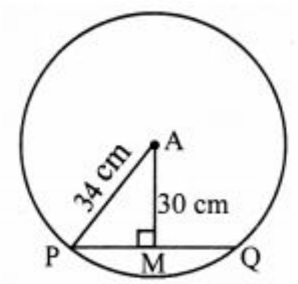
PA is radius and PQ is chord,

seg AM $\perp$ chord PQ, P-M-Q

AP = 34 cm, AM = 30 cm

To Find: Length of the chord (PQ) = ?

Solution:



In ΔAMP,

$\angle AMP = 90°$

$\therefore AP^2 = AM^2 + PM^2$ ...(Pythagoras theorem)

$34^2 = 30^2 + PM^2$

$\therefore PM^2 = 34^2 - 30^2$

$\therefore PM^2 = (34 - 30)(34 + 30)$ ...($a^2 - b^2 = (a - b)(a + b)$)

$\therefore PM^2 = 4 \times 64$

$\therefore PM = \sqrt{4x64}$ ...(1) (Taking square root on both sides)

$\therefore PM = 2 \times 8 = 16cm$

Now, $PM = \frac{1}{2}(PQ)$ ...(Perpendicular drawn from the centre of a circle to the chord bisects the chord)

$16 = \frac{1}{2}(PQ)$ ...(From (1))

$\therefore PQ = 16 \times 2$

$\therefore PQ = 32cm$

$\therefore$ The length of the chord of the circle is 32cm.

Q4)

(1) In $\square$ABQP,

side AB ∥ side PQ ... (Given)

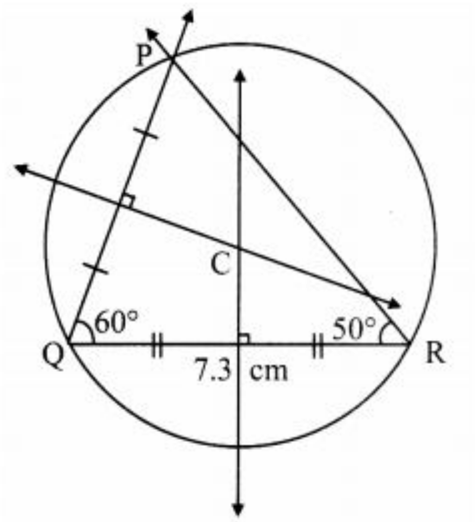
side AB ≅ side PQ ... (Given)

$\therefore \square$ABQP is a parallelogram

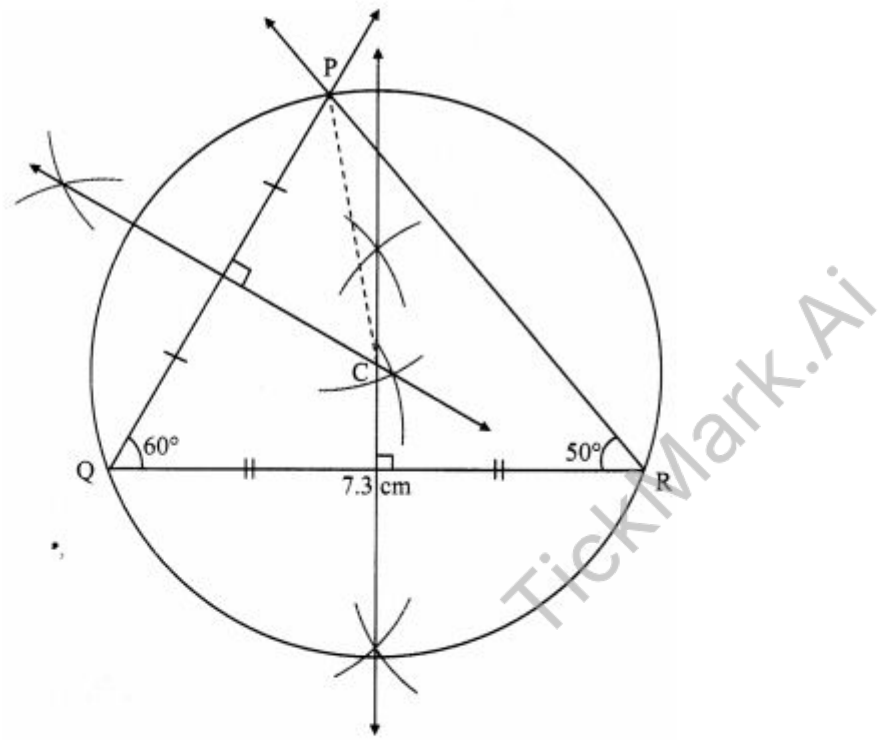
(A ☐ABQPis parallelogram if the same pair of opposite sides is parallel as well as ≅)
∴ AP = BQ,
AP∥ BQ ... (Opposite sides of parallelogram are parallel and congruent)

In ☐ACRP,
side AC ∥ side PR
side AC ≅ side PR ... (Given)
∴ ☐ACRP is a parallelogram
(A ☐ ACRP is parallelogram if the same pair of opposite sides is parallel as well as ≅)
side AP ≅ side CR
and AP ∥ CR ... (Opposite sides of parallelogram are parallel and congruent)

In ▫ BCRQ
side BQ ∥ side CR
side BQ ≅ side CR ...(From (3) and (4))
∴ ☐BCRQ is a parallelogram
(A ☐BCRQ is parallelogram if the same pair of opposiet sides is parallel as well as ≅)
∴ seg BC ∥ seg QR .... (Opposite sides of parallelogram are parallel) and seg BC ≅ seg QR.
(2) In ΔPQR,
$\angle P + \angle Q + \angle R = 180°$ ...(Seem of all angles of a Δ is 180°)
∴ $70° + \angle Q + 50° = 180°$
∴ $120° + \angle Q = 180°$
∴ $\angle Q = 180° - 120°$
∴ $\angle Q = 60°$



Rough Figure



All the Best