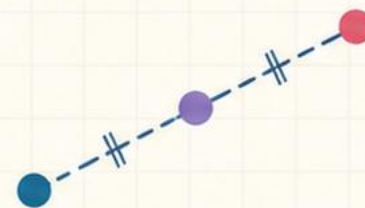
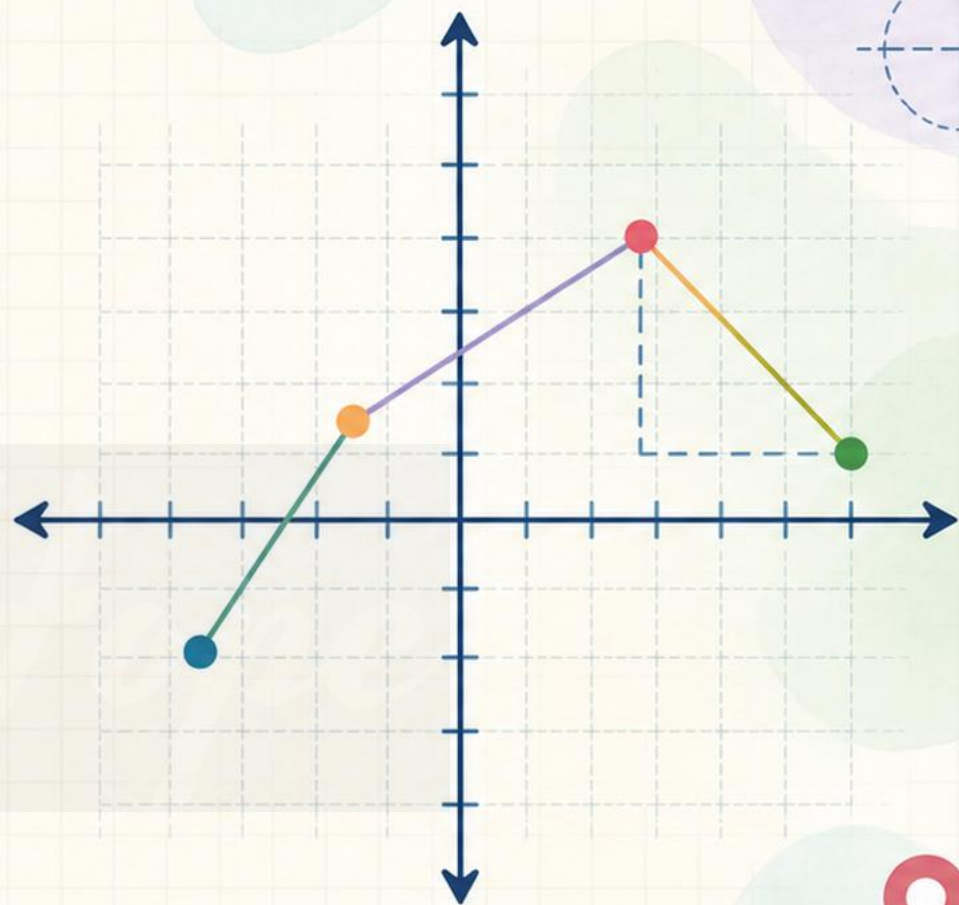


MATHEMATICS • CLASS 10

CHAPTER 7

Coordinate Geometry

NCERT SOLUTIONS



EXERCISE 7.1 — Q1

Q1. Find the distance between each pair of points.

Use the distance formula: $d = \sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2]}$

(i) $(2, 3)$ and $(4, 1)$

$$\begin{aligned}d &= \sqrt{[(4 - 2)^2 + (1 - 3)^2]} \\&= \sqrt{[2^2 + (-2)^2]} \\&= \sqrt{(4 + 4)} = \sqrt{8}\end{aligned}$$

Answer: $2\sqrt{2}$ units.

(ii) $(-5, 7)$ and $(-1, 3)$

$$\begin{aligned}d &= \sqrt{[(-1 + 5)^2 + (3 - 7)^2]} \\&= \sqrt{[4^2 + (-4)^2]} \\&= \sqrt{(16 + 16)} = \sqrt{32}\end{aligned}$$

Answer: $4\sqrt{2}$ units.

(iii) (a, b) and $(-a, -b)$

$$\begin{aligned}d &= \sqrt{[(-a - a)^2 + (-b - b)^2]} \\&= \sqrt{[(-2a)^2 + (-2b)^2]} \\&= \sqrt{[4(a^2 + b^2)]}\end{aligned}$$

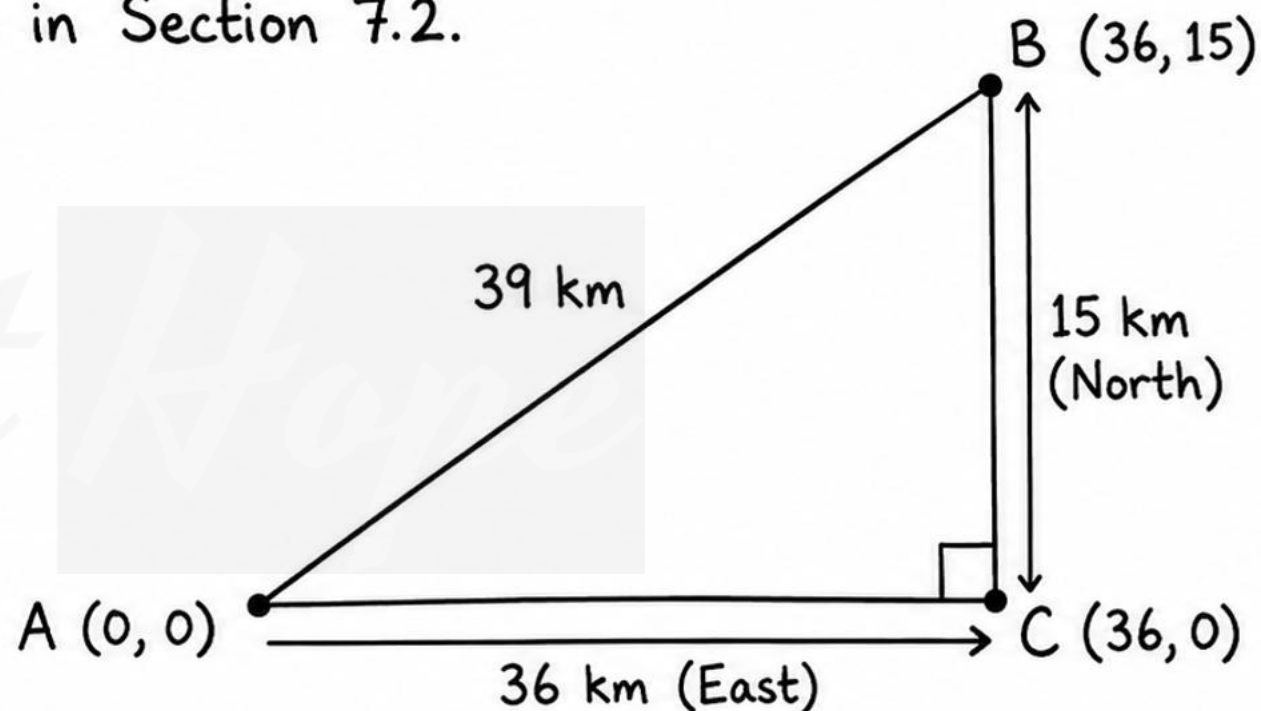
Answer: $2\sqrt{a^2 + b^2}$ units.

EXERCISE 7.1 — Q2

Q2. Find the distance between $(0, 0)$ and $(36, 15)$. Hence find the distance between the two towns in Section 7.2.

Let $A = (0, 0)$ and $B = (36, 15)$.

$$\begin{aligned} AB &= \sqrt{[(36 - 0)^2 + (15 - 0)^2]} \\ &= \sqrt{(36^2 + 15^2)} \\ &= \sqrt{(1296 + 225)} \\ &= \sqrt{1521} \\ &= 39 \text{ units} \end{aligned}$$



In the town situation, B is 36 km east and 15 km north of A.
Each coordinate unit represents 1 km.

Answer: The distance between the towns is 39 km.

EXERCISE 7.1 — Q3

Q3. Determine whether $(1, 5)$, $(2, 3)$ and $(-2, -11)$ are collinear.

Let $A = (1, 5)$, $B = (2, 3)$, $C = (-2, -11)$.

$$\begin{aligned} AB &= \sqrt{(2-1)^2 + (3-5)^2} \\ &= \sqrt{1+4} \\ &= \sqrt{5} \approx 2.24 \end{aligned}$$

$$\begin{aligned} BC &= \sqrt{(-2-2)^2 + (-11-3)^2} \\ &= \sqrt{16+196} \\ &= \sqrt{212} \approx 14.56 \end{aligned}$$

$$\begin{aligned} AC &= \sqrt{(-2-1)^2 + (-11-5)^2} \\ &= \sqrt{9+256} \\ &= \sqrt{265} \approx 16.28 \end{aligned}$$

All distances are in units.

For three distinct collinear points, the longest distance equals the sum of the other two. Here AC is longest, but:

$$AB + BC \approx 2.24 + 14.56 = 16.80 > 16.28 \approx AC$$

Answer: The three points are NOT collinear.

EXERCISE 7.1 – Q4

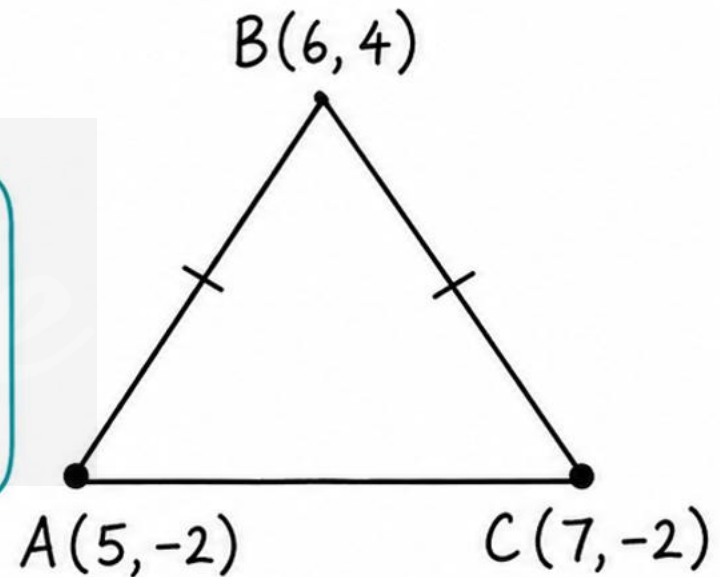
Q4. Check whether $(5, -2)$, $(6, 4)$ and $(7, -2)$ form an isosceles triangle.

Let $A = (5, -2)$, $B = (6, 4)$, $C = (7, -2)$.

$$\begin{aligned} AB &= \sqrt{(6-5)^2 + (4+2)^2} \\ &= \sqrt{(1+36)} = \sqrt{37} \text{ units} \end{aligned}$$

$$\begin{aligned} BC &= \sqrt{(7-6)^2 + (-2-4)^2} \\ &= \sqrt{(1+36)} = \sqrt{37} \text{ units} \end{aligned}$$

$$\begin{aligned} AC &= \sqrt{(7-5)^2 + (-2+2)^2} \\ &= \sqrt{4+0} = 2 \text{ units} \end{aligned}$$



Thus $AB = BC$.

Also $AB + BC = 2\sqrt{37} > 2 = AC$, so the points form a triangle.

Answer: Yes, ABC is an isosceles triangle, with equal sides AB and BC .



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