

## Lesson Worksheet 10.1A(I)

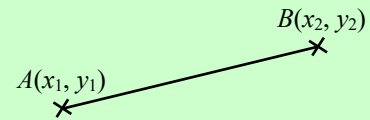
*Objective: To apply the distance formula.*

The distance between any two points  $A(x_1, y_1)$  and  $B(x_2, y_2)$

on a rectangular coordinate plane is give by

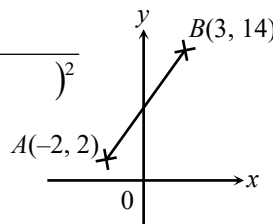
直角坐標平面上任何兩點  $A(x_1, y_1)$  和  $B(x_2, y_2)$  之間的距離可表示成：

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$



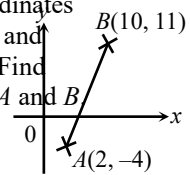
1. In the figure, the coordinates of  $A$  and  $B$  are  $(-2, 2)$  and  $(3, 14)$  respectively. Find the distance between  $A$  and  $B$ .

$$\begin{aligned} AB &= \sqrt{(3 - (-2))^2 + (14 - 2)^2} \\ &= \sqrt{5^2 + 12^2} \\ &= \sqrt{169} \\ &= \underline{13 \text{ units}} \end{aligned}$$



### Demonstration

In the figure, the coordinates of  $A$  and  $B$  are  $(2, -4)$  and  $(10, 11)$  respectively. Find the distance between  $A$  and  $B$ .



### Solution

$$\begin{aligned} AB &= \sqrt{(10 - 2)^2 + [11 - (-4)]^2} \text{ units} \\ &= \sqrt{8^2 + 15^2} \text{ units} \\ &= \sqrt{289} \text{ units} \\ &= \underline{17 \text{ units}} \end{aligned}$$

2. In each of the following, find the distance between the given points.  
(Leave the answers in surd form if necessary.)

- (a)  $A(11, 3), B(8, -1)$

$$\begin{aligned} AB &= \sqrt{(8 - 11)^2 + (-1 - 3)^2} \\ &= \sqrt{(-3)^2 + (-4)^2} \\ &= \sqrt{25} \\ &= \underline{5 \text{ units}} \end{aligned}$$

- (b)  $C(3, -2), D(-1, 6)$

$$\begin{aligned} CD &= \sqrt{(-1 - 3)^2 + [6 - (-2)]^2} \\ &= \sqrt{(-4)^2 + 8^2} \\ &= \sqrt{80} \text{ units} \end{aligned}$$

- (c)  $E(-4, 13), F(5, 7)$

$$\begin{aligned} EF &= \sqrt{[5 - (-4)]^2 + (7 - 13)^2} \\ &= \sqrt{9^2 + (-6)^2} \\ &= \sqrt{117} \text{ units} \end{aligned}$$

3. In each of the following, find the distance between the given points.

(Leave the answers in surd form if necessary.)

(a)  $A(-12, 5), B(9, 25)$

$$\begin{aligned} AB &= \sqrt{[9 - (-12)]^2 + (25 - 5)^2} \\ &= \sqrt{21^2 + 20^2} \\ &= \sqrt{841} \\ &= \underline{29 \text{ units}} \end{aligned}$$

What is the distance formula?

(b)  $C(17, -8), D(-7, -1)$

$$\begin{aligned} CD &= \sqrt{(-7 - 17)^2 + [-1 - (-8)]^2} \\ &= \sqrt{(-24)^2 + 7^2} \\ &= \sqrt{625} \\ &= \underline{25 \text{ units}} \end{aligned}$$

(c)  $E(21, 18), F(3, 12)$

$$\begin{aligned} EF &= \sqrt{(3 - 21)^2 + (12 - 18)^2} \\ &= \sqrt{(-18)^2 + (-6)^2} \\ &= \sqrt{360} \text{ units} \end{aligned}$$

(d)  $G(-19, -5), H(-14, 8)$

$$\begin{aligned} GH &= \sqrt{[-14 - (-19)]^2 + [8 - (-5)]^2} \\ &= \sqrt{5^2 + 13^2} \\ &= \sqrt{194} \text{ units} \end{aligned}$$