Finding Distance

Example

Find the distance between A(−2, 1) and B(3, 4).

A(−2, 1) B(3, 4)

x_1 y_1 x_2 y_2

$$AB = \sqrt{(3 - -2)^2 + (4 - 1)^2}$$
$$= \sqrt{5^2 + 3^2}$$
$$= \sqrt{25 + 9}$$
$$= \sqrt{34} \text{ units}$$

1 Find the distance between the following pairs of points:

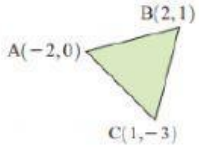
a A(3, 1) and B(5, 3)

b C(−1, 2) and D(6, 2)

c O(0, 0) and P(−2, 4)

d E(8, 0) and F(2, 0)

Consider the points A(−2, 0), B(2, 1) and C(1, −3).
Determine if the triangle ABC is equilateral, isosceles or scalene.



$AB = \sqrt{(2--2)^2 + (1-0)^2}$
$= \sqrt{4^2 + 1^2}$
$= \sqrt{17}$ units

$BC = \sqrt{(1-2)^2 + (-3-1)^2}$
$= \sqrt{(-1)^2 + (-4)^2}$
$= \sqrt{17}$ units

$AC = \sqrt{(1--2)^2 + (-3-0)^2}$
$= \sqrt{3^2 + (-3)^2}$
$= \sqrt{18}$ units

As AB = BC, triangle ABC is isosceles.

2 Classify triangle ABC as either equilateral, isosceles or scalene:

a A(3, −1), B(1, 8), C(−6, 1)

b A(1, 0), B(3, 1), C(4, 5)

Example

Find b given that A(3, −2) and B(b, 1) are $\sqrt{13}$ units apart.

From A to B, x-step $= b - 3$
y-step $= 1 - -2 = 3$

$\therefore \sqrt{(b-3)^2 + 3^2} = \sqrt{13}$
$\therefore (b-3)^2 + 9 = 13$
$\therefore (b-3)^2 = 4$
$\therefore b - 3 = \pm 2$
$\therefore b = 3 \pm 2$
$\therefore b = 5$ or 1.

Find a given that:

a P(2, 3) and Q(a, −1) are 4 units apart

b P(−1, 1) and Q(a, −2) are 5 units apart