Coordinate Geometry

Exercise 7.1

1. (2, 3) (4, 1)

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

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

$= \sqrt{(2)^2 + (-2)^2}$

$= \sqrt{4 + (4)} = \sqrt{8}$

$= 2\sqrt{2}$

(2) (−5, 7), (−1, 3)

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

$= \sqrt{(-1 - (-5))^2 + (3 - 7)^2}$

$= \sqrt{(4)^2 + (-4)^2}$

$= \sqrt{16 + 16}$

$\Rightarrow \sqrt{16 + 16} = \sqrt{32}$

$\Rightarrow \sqrt{} = \sqrt{2 \times 2 \times 2 \times 2 \times 2}$

$= \sqrt{} = 2 \times 2 \sqrt{2}$

$= \sqrt{(2)(2)(2)} \times 2 = 4\sqrt{2}$

$= 8\sqrt{2}$

(a, b) (−a, −b)

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

$$= \sqrt{(-a-a)^2+(-b-b)^2}$$

$$= \sqrt{(-2a)^2+(-2b)^2}$$

$$= \sqrt{4a^2+4b^2}$$

$$= \sqrt{4(a^2+b^2)}$$

$$= 2\sqrt{a^2+b^2}$$

2. (0, 0) and (36, 15)

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

$$= \sqrt{(36-0)^2+(15-0)^2}$$

$$= \sqrt{(36)^2+(15)^2}$$

$$= \sqrt{1296+225}$$

$$= \sqrt{1521}$$

$$= \sqrt{3\times3\times13\times13}$$

$$= 3\times13$$

$$= 39$$

3.

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

$= \sqrt{(2-1)^2+(3-(-1))^2}$

$= \sqrt{(1)^2+(3-5)^2}$

$= \sqrt{(1)^2+(-2)^2}$

$= \sqrt{1+4}$

$= \sqrt{5}$

$= \sqrt{(x_3-x_2)^2+(y_3-y_2)^2}$

$= \sqrt{(-2-2)^2+(-11-3)^2}$

$= \sqrt{(-4)^2+(-14)^2}$

$= \sqrt{16+(196)}$

$= \sqrt{212}$

$= 2\sqrt{53}$

Hence they are not collinear

4. (5, -2), (6, 4) and (7, -2)

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

$= \sqrt{(6-5)^2+(4-2)^2}$

$= \sqrt{(1)^2+(2)^2}$

$= \sqrt{1+4}$

$= \sqrt{4}$

$= 2$

$$\sqrt{(x_3-x_2)^2+(y_3-y_2)^2}$$

$$= \sqrt{(7-6)^2+(-2+4)}$$

$$= \sqrt{(1)^2+(2)^2}$$

$$= \sqrt{4}$$

$$= 2$$

Thus are vertices of an isosceles triangles