

Exercise 9.1

Q.1 Find the distance between the following pairs of points

Solution:

(a) $A(9, 2), B(7, 2)$

$$\text{Distance} = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$|AB| = \sqrt{|7 - 9|^2 + |2 - 2|^2}$$

$$|AB| = \sqrt{(-2)^2 + (0)^2}$$

$$|AB| = \sqrt{4}$$

$$|AB| = 2$$

(b) $A(2, -6), B(3, -6)$

$$\text{Distance} = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$|AB| = \sqrt{|3 - 2|^2 + |-6 - (-6)|^2}$$

$$|AB| = \sqrt{(1)^2 + (-6 + 6)^2}$$

$$|AB| = \sqrt{1 + (0)^2}$$

$$|AB| = \sqrt{1}$$

$$AB = 1$$

(c) $A(-8, 1), B(6, 1)$

$$\text{Distance} = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$|AB| = \sqrt{|6 - (-8)|^2 + |1 - 1|^2}$$

$$|AB| = \sqrt{(6 + 8)^2 + (0)^2}$$

$$|AB| = \sqrt{(14)^2}$$

$$|AB| = 14$$

(d) $A(-4, \sqrt{2}), B(-4, -3)$

$$d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

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

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

$$|AB| = \sqrt{(0)^2 + (3 + \sqrt{2})^2}$$

$$|AB| = \sqrt{(3 + \sqrt{2})^2}$$

$$|AB| = 3 + \sqrt{2}$$

(e) $A(3, -11), B(3, -4)$

$$d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$|AB| = \sqrt{|3 - 3|^2 + |-4 - (-11)|^2}$$

$$|AB| = \sqrt{(0)^2 + (-4 + 11)^2}$$

$$|AB| = \sqrt{(7)^2}$$

$$|AB| = 7$$

(f) $A(0, 0), B(0, -5)$

$$d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$|AB| = \sqrt{|0 - 0|^2 + |-5 - 0|^2}$$

$$|AB| = \sqrt{(-5)^2}$$

$$|AB| = \sqrt{25}$$

$$|AB| = 5$$

Q.2 Let P be the point on x -axis with x -coordinate a and Q be the point on y -axis with y coordinate b as given below. Find the distance between P and Q

Solution:

(i) $a = 9, b = 7$

P is $(9, 0)$ and Q $(0, 7)$

$$d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$|PQ| = \sqrt{|0 - 9|^2 + |7 - 0|^2}$$

$$|P Q| = \sqrt{(-9)^2 + (7)^2}$$

$$|P Q| = \sqrt{81 + 49}$$

$$|P Q| = \sqrt{130}$$

(ii) $a = 2, b = 3$

$$P(2, 0), Q(0, 3)$$

$$d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$|P Q| = \sqrt{|0 - 2|^2 + |3 - 0|^2}$$

$$|P Q| = \sqrt{(-2)^2 + (3)^2}$$

$$|P Q| = \sqrt{4 + 9}$$

$$|P Q| = \sqrt{13}$$

(iii) $a = -8, b = 6$

$$P(-8, 0), Q(0, 6)$$

$$|d| = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$|P Q| = \sqrt{|0 - (-8)|^2 + |6 - 0|^2}$$

$$|P Q| = \sqrt{(8)^2 + (6)^2}$$

$$|P Q| = \sqrt{64 + 36}$$

$$|P Q| = \sqrt{100}$$

$$|P Q| = 10$$

(iv) $a = -2, b = -3$

$$P(-2, 0), Q(0, -3)$$

$$|d| = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$d = \sqrt{|0 - (-2)|^2 + |-3 - 0|^2}$$

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

$$d = \sqrt{4 + 9}$$

$$d = \sqrt{13}$$

(v) $a = \sqrt{2}, b = 1$

$$P(\sqrt{2}, 0), Q(0, 1)$$

$$d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$d = \sqrt{|0 - \sqrt{2}|^2 + |1 - 0|^2}$$

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

$$d = \sqrt{2 + 1}$$

$$d = \sqrt{3}$$

(vi) $a = -9, b = -4$

$$P(-9, 0), Q(0, -4)$$

$$d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$|P Q| = \sqrt{|0 - (-9)|^2 + |-4 - 0|^2}$$

$$|P Q| = \sqrt{(9)^2 + (-4)^2}$$

$$|P Q| = \sqrt{81 + 16}$$

$$|P Q| = \sqrt{97}$$