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

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

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

$$|A\,B| = \sqrt{(6+8)^2 + (0)^2}$$

$$|A\,B| = \sqrt{(14)^2}$$

$$|A\,B| = 14$$

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

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

$$|A\,B| = \sqrt{\left|-4-(-4)\right|^2 + \left|-3-\sqrt{2}\right|^2}$$

$$|A\,B| = \sqrt{(-4+4)^2 + \left(-\left(3+\sqrt{2}\right)\right)^2}$$

$$|A\,B| = \sqrt{(0)^2 + \left(3+\sqrt{2}\right)^2}$$

$$|A\,B| = \sqrt{\left(3+\sqrt{2}\right)^2}$$

$$|A\,B| = 3+\sqrt{2}$$

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

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

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

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

$$|A\,B| = \sqrt{(7)^2}$$

$$|A\,B| = 7$$

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

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

$$|A\,B| = \sqrt{|0-0|^2 + |-5-0|^2}$$

$$|A\,B| = \sqrt{(-5)^2}$$

$$|A\,B| = \sqrt{25}$$

$$|A\,B| = 5$$

Q.2 Let P be the print 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)

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

$$|P\,Q| = \sqrt{|0-9|^2 + |7-0|^2}$$

$$|P\ Q| = \sqrt{(-9)^2 + (7)^2}$$
$$|P\ Q| = \sqrt{81+49}$$
$$|P\ Q| = \sqrt{130}$$

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

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

$$d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$
$$|P\ Q| = \sqrt{|0-(-9)|^2 + |-4-0|^2}$$
$$|P\ Q| = \sqrt{(9)^2 + (-4)^2}$$
$$|P\ Q| = \sqrt{81+16}$$
$$|P\ Q| = \sqrt{97}$$

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Report any mistake at freeilm786@gmail.com