Exercise 9.1

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

Solution:

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

(LHR 2016, GRW 2014, 17, FSD 2014, 15, SWL 2016, 17, D.G.K 2013)

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

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

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

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

$$|AB| = 2$$

(b) $A(2,-6), B(3,-6)$ **(K.B + A.B + U.B)**

(LHR 2017, MTN 2016, SWL 2014, RWP 2016, D.G.K 2014, 15, 16)

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

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

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

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

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

$$|AB| = 1$$

(c) $A(-8,1), B(6,1)$ **(K.B + A.B + U.B)**

(LHR 2015, 17, GRW 2015, FSD 2013, 15, MTN 2013, 17, BWP 2013, SGD 2016, 17, D.G.K 2014)

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

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

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

$$|A\ B| = 14$$

(d) $A(-4,\sqrt{2}), B(-4,-3)$ **(K.B+A.B +U.B)**

(LHR 2013, 15, SWL 2015, MTN 2013, BWP 2014, D.G.K 2017, SGD 2017)

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

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

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

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

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

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

(e) $A(3,-11), B(3,-4)$ **(K.B + A.B + U.B)**

(LHR 2014, GRW 2013, SGD 2015, MTN 2014, 15, SWL 2015, BWP 2017)

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

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

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

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

$$|A\ B| = 7$$

(f) $A(0,0), B(0,-5)$ **(K.B + A.B + U.B)**

(LHR 2013, GRW 2013, SGD 2017, D.G.K 2015)

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

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

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

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

$$|A\ B| = 5$$

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

Solution:

(i) $a = 9, b = 7$ **(K.B + A.B + U.B)**

P (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) $a = 2, b = 3$ **(K.B + A.B + U.B)**

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

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

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

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

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

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

(iii) $a = -8, b = 6$ **(K.B + A.B + U.B)**

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

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

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

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

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

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

$$|P\ Q| = 10$$

(iv) $a = -2, b = -3$ **(K.B + A.B + U.B)**

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

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

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

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

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

$$d = \sqrt{13}$$

(v) $a = \sqrt{2}, b = 1$ **(K.B + A.B + U.B)**

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

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

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

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

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

$$d = \sqrt{3}$$

(vi) $a = -9, b = -4$ **(K.B + A.B + U.B)**

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

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

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

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

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

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