

SOLUTIONS:

Change in x, Change in y, Distance

1) $A(-3, 4)$ and $B(5, -2)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (5) - (-3)$$

$$\Delta x = 5 + 3$$

$$\Delta x = 8$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (-2) - (4)$$

$$\Delta y = -2 - 4$$

$$\Delta y = -6$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(8)^2 + (-6)^2} \\ &= \sqrt{64 + 36} \\ &= \sqrt{100} \\ &= 10 \text{ units}\end{aligned}$$

2) $C(-15, 4)$ and $D(-7, -2)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (-7) - (-15)$$

$$\Delta x = -7 + 15$$

$$\Delta x = 8$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (-2) - (4)$$

$$\Delta y = -2 - 4$$

$$\Delta y = -6$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(8)^2 + (-6)^2} \\ &= \sqrt{64 + 36} \\ &= \sqrt{100} \\ &= 10 \text{ units}\end{aligned}$$

3) $E(-70, 48)$ and $F(-65, 36)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (-65) - (-70)$$

$$\Delta x = -65 + 70$$

$$\Delta x = 5$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (36) - (48)$$

$$\Delta y = 36 - 48$$

$$\Delta y = -12$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(5)^2 + (-12)^2} \\ &= \sqrt{25 + 144} \\ &= \sqrt{169} \\ &= 13 \text{ units}\end{aligned}$$

4) $G(17, -4)$ and $H(-7, -14)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (-7) - (17)$$

$$\Delta x = -7 - 17$$

$$\Delta x = -24$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (-14) - (-4)$$

$$\Delta y = -14 + 4$$

$$\Delta y = -10$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(-24)^2 + (-10)^2} \\ &= \sqrt{576 + 100} \\ &= \sqrt{676} \\ &= 26 \text{ units}\end{aligned}$$

5) $I(5, 8)$ and $J(-3, 2)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (-3) - (5)$$

$$\Delta x = -3 - 5$$

$$\Delta x = -8$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (2) - (8)$$

$$\Delta y = 2 - 8$$

$$\Delta y = -6$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(-8)^2 + (-6)^2} \\ &= \sqrt{64 + 36} \\ &= \sqrt{100} \\ &= 10 \text{ units}\end{aligned}$$

6) $K(4.8, 1.3)$ and $L(3.6, 1.8)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (3.6) - (4.8)$$

$$\Delta x = 3.6 - 4.8$$

$$\Delta x = -1.2$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (1.8) - (1.3)$$

$$\Delta y = 1.8 - 1.3$$

$$\Delta y = 0.5$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\&= \sqrt{(-1.2)^2 + (0.5)^2} \\&= \sqrt{1.44 + 0.25} \\&= \sqrt{1.65} \\&= 1.3 \text{ units}\end{aligned}$$

7) $M(14, -7)$ and $N(20, 13)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (20) - (14)$$

$$\Delta x = 20 - 14$$

$$\Delta x = 6$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (13) - (-7)$$

$$\Delta y = 13 + 7$$

$$\Delta y = 20$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\&= \sqrt{(6)^2 + (20)^2} \\&= \sqrt{36 + 400} \\&= \sqrt{436} \\&\approx 20.88 \text{ units}\end{aligned}$$

8) $Q(343, 92)$ and $R(303, 32)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (303) - (343)$$

$$\Delta x = 303 - 343$$

$$\Delta x = -40$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (32) - (92)$$

$$\Delta y = 32 - 92$$

$$\Delta y = -60$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\&= \sqrt{(-40)^2 + (-60)^2} \\&= \sqrt{1600 + 3600} \\&= \sqrt{5200} \\&\approx 72.11 \text{ units}\end{aligned}$$

9) $S(-7.5, 9)$ and $T(19.5, 4)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (19.5) - (-7.5)$$

$$\Delta x = 19.5 + 7.5$$

$$\Delta x = 27$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (4) - (9)$$

$$\Delta y = 4 - 9$$

$$\Delta y = -5$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\&= \sqrt{(27)^2 + (-5)^2} \\&= \sqrt{729 + 25} \\&= \sqrt{754} \\&\approx 27.46 \text{ units}\end{aligned}$$

10) $U(18.35, 14.2)$ and
 $V(53.35, 45.8)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (53.35) - (18.35)$$

$$\Delta x = 53.35 - 18.35$$

$$\Delta x = 35$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (45.8) - (14.2)$$

$$\Delta y = 45.8 - 14.2$$

$$\Delta y = 31.6$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\&= \sqrt{(35)^2 + (31.6)^2} \\&= \sqrt{1225 + 998.56} \\&= \sqrt{2223.56} \\&\approx 47.15 \text{ units}\end{aligned}$$

11) $A(-3, 4)$ and $C(-15, 4)$

$$\begin{aligned}\Delta x &= x_2 - x_1 \\ \Delta x &= (-15) - (-3) \\ \Delta x &= -15 + 3 \\ \Delta x &= -12\end{aligned}$$

$$\begin{aligned}\Delta y &= y_2 - y_1 \\ \Delta y &= (4) - (4) \\ \Delta y &= 4 - 4 \\ \Delta y &= 0\end{aligned}$$

$$\begin{aligned}d(A, C) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(-12)^2 + (0)^2} \\ &= \sqrt{144 + 0} \\ &= \sqrt{144} \\ &= 12 \text{ units}\end{aligned}$$

12) $B(5, -2)$ and $D(-7, -2)$

$$\begin{aligned}\Delta x &= x_2 - x_1 \\ \Delta x &= (-7) - (5) \\ \Delta x &= -7 - 5 \\ \Delta x &= -12\end{aligned}$$

$$\begin{aligned}\Delta y &= y_2 - y_1 \\ \Delta y &= (-2) - (-2) \\ \Delta y &= -2 + 2 \\ \Delta y &= 0\end{aligned}$$

$$\begin{aligned}d(B, D) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(-12)^2 + (0)^2} \\ &= \sqrt{144 + 0} \\ &= \sqrt{144} \\ &= 12 \text{ units}\end{aligned}$$

13) $E(-70, 48)$ and $G(17, -4)$

$$\begin{aligned}\Delta x &= x_2 - x_1 \\ \Delta x &= (17) - (-70) \\ \Delta x &= 17 + 70 \\ \Delta x &= 87\end{aligned}$$

$$\begin{aligned}\Delta y &= y_2 - y_1 \\ \Delta y &= (-4) - (48) \\ \Delta y &= -4 - 48 \\ \Delta y &= -52\end{aligned}$$

$$\begin{aligned}d(E, G) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(87)^2 + (-52)^2} \\ &= \sqrt{7569 + 2704} \\ &= \sqrt{10273} \\ &\approx 101.36 \text{ units}\end{aligned}$$

14) $F(-65, 36)$ and $H(7, -14)$

$$\begin{aligned}\Delta x &= x_2 - x_1 \\ \Delta x &= (7) - (-65) \\ \Delta x &= 7 + 65 \\ \Delta x &= 72\end{aligned}$$

$$\begin{aligned}\Delta y &= y_2 - y_1 \\ \Delta y &= (-14) - (36) \\ \Delta y &= -14 - 36 \\ \Delta y &= -50\end{aligned}$$

$$\begin{aligned}d(F, H) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(72)^2 + (-50)^2} \\ &= \sqrt{5184 + 2500} \\ &= \sqrt{7684} \\ &\approx 87.65 \text{ units}\end{aligned}$$

15) $I(5, 8)$ and $M(14, -7)$

$$\begin{aligned}\Delta x &= x_2 - x_1 \\ \Delta x &= (14) - (5) \\ \Delta x &= 14 - 5 \\ \Delta x &= 9\end{aligned}$$

$$\begin{aligned}\Delta y &= y_2 - y_1 \\ \Delta y &= (-7) - (8) \\ \Delta y &= -7 - 8 \\ \Delta y &= -15\end{aligned}$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(9)^2 + (15)^2} \\ &= \sqrt{81 + 225} \\ &= \sqrt{306} \\ &\approx 17.49 \text{ units}\end{aligned}$$

16) $J(-3, 2)$ and $N(20, 13)$

$$\begin{aligned}\Delta x &= x_2 - x_1 \\ \Delta x &= (20) - (-3) \\ \Delta x &= 20 + 3 \\ \Delta x &= 23\end{aligned}$$

$$\begin{aligned}\Delta y &= y_2 - y_1 \\ \Delta y &= (13) - (2) \\ \Delta y &= 13 - 2 \\ \Delta y &= 11\end{aligned}$$

$$\begin{aligned}d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(23)^2 + (1)^2} \\ &= \sqrt{529 + 121} \\ &= \sqrt{650} \\ &\approx 25.5 \text{ units}\end{aligned}$$

17) $Q(343, 92)$ and $T(19.5, 4)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (343) - (19.5)$$

$$\Delta x = 343 - 19.5$$

$$\Delta x = 323.5$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (4) - (92)$$

$$\Delta y = 4 - 92$$

$$\Delta y = -88$$

$$\begin{aligned} d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(323.5)^2 + (-88)^2} \\ &= \sqrt{104.625 + 7744} \\ &= \sqrt{112\,936.25} \\ &= 335.26 \text{ units} \end{aligned}$$

18) $R(303, 32)$ and $M(14, -7)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (14) - (303)$$

$$\Delta x = 14 - 303$$

$$\Delta x = -289$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (-7) - (32)$$

$$\Delta y = -7 - 32$$

$$\Delta y = -39$$

$$\begin{aligned} d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(-289)^2 + (-39)^2} \\ &= \sqrt{83521 + 1521} \\ &= \sqrt{85\,042} \\ &= 291.62 \text{ units} \end{aligned}$$

19) $S(-7.5, 9)$ and $N(20, 13)$

$$\Delta x = x_2 - x_1$$

$$\Delta x = (20) - (-7.5)$$

$$\Delta x = 20 + 7.5$$

$$\Delta x = 27.5$$

$$\Delta y = y_2 - y_1$$

$$\Delta y = (13) - (9)$$

$$\Delta y = 13 - 9$$

$$\Delta y = 4$$

$$\begin{aligned} d(A, B) &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(27.5)^2 + (4)^2} \\ &= \sqrt{756.25 + 16} \\ &= \sqrt{772.25} \\ &= 27.79 \text{ units} \end{aligned}$$