Name: _____ Date: _____ Period: _____

2

Distance and Midpoint Formulas

Find the distance between the two points.

1. (-2, 7) and (3, -5)

2. (5, 2) and (3, 8)

3. (8, -1) and (-4, 3)

The distance *d* between two points is given. Find possible values for *b*.

4. $d = 15$; $(3, b)$ and (-6, 2)

5. $d = \sqrt{37}$; (-5, 3) and $(b, 2)$

Find the midpoint of the line segment with the given endpoints.

6. (14, 3) and (6, 9)

7. (0, 9) and (-4, -6)

8. (-11, -2) and (2, -5)

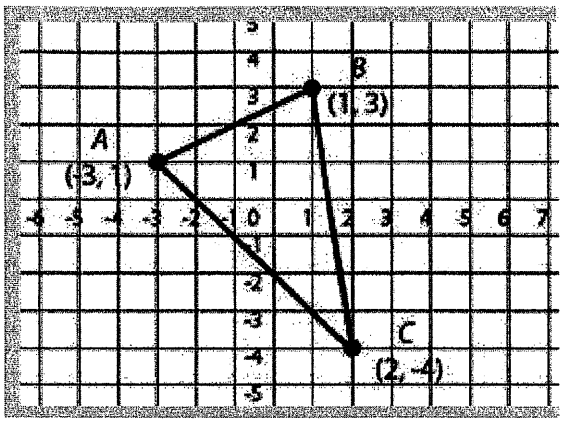
The midpoint and endpoint of a line segment are given. Find the other endpoint.

9. Midpoint (-3, 5) and Endpoint (-8, 2)

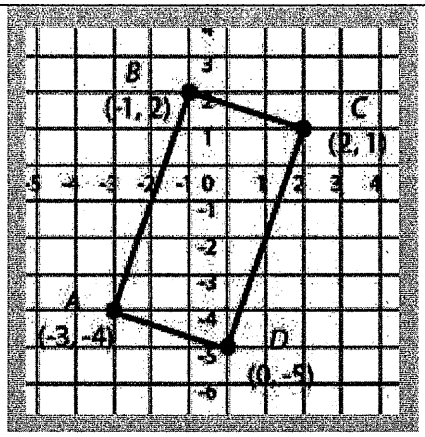
10. Midpoint (2.5, -6) and Endpoint (-1, -10)

Perimeter and Area of Triangles and Rectangles on a Coordinate Plane

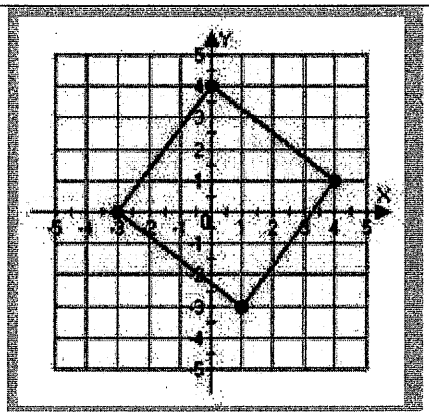
1. Find the Perimeter of the triangle



2. Find the Perimeter and the area of the rectangle



3. Find the Perimeter and the area of the square



Find the distance between each pair of points. $d^2 = \Delta x^2 + \Delta y^2$

4. (-4, 5), (2, 3)

5. (0, -7), (3, -1)

Find the possible values for **a** given the distance between the 2 points:

6. d = 5 ; (3, 5) and (a, 8)

7. $d = \sqrt{10}$; (5,a), (6,1)

Find the midpoint of the line segment with the given endpoints. $M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

8. (1, -10), (-7, -6)

9. (10, 8), (10, 7)

Find the other endpoint of the line segment with the given endpoint and midpoint.

10. Endpoint: (5, -4), midpoint: (-4, 3)

11. Endpoint: (-5, 4), midpoint: (6, 3)

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$c^2 = a^2 + b^2$

Distance and Midpoint Formulas

$d^2 = \Delta x^2 + \Delta y^2$

Find the distance between the two points.

1. (-2, 7) and (3, -5)

$x_1\ y_1 \quad x_2\ y_2$

$\Delta x = 3 - -2 = 5$

$\Delta y = -5 - 7 = -12$

$d^2 = (5)^2 + (12)^2$

$d^2 = 169 \quad \boxed{d = 13}$

2. (5, 2) and (3, 8)

$x_1\ y_1 \quad x_2\ y_2$

$\Delta x = 3 - 5 = -2$

$\Delta y = 8 - 2 = 6$

$d^2 = (-2)^2 + (6)^2$

$d^2 = 4 + 36 = 40 \quad d^2 = 40 \quad d = \sqrt{40}$

3. (8, -1) and (-4, 3)

$x_1\ y_1 \quad x_2\ y_2$

$\Delta x = -4 - 8 = -12$

$\Delta y = 3 - -1 = 4$

$d^2 = (-12)^2 + (4)^2$

$d^2 = 144 + 16 = 160$

$d = \sqrt{160}$

The distance d between two points is given. Find possible values for b.

4. d = 15; (3, b) and (-6, 2)

$x_1\ y_1 \quad x_2\ y_2$

$\Delta x = -6 - 3 = -9$

$\Delta y = 2 - b$

$15^2 = (-9)^2 + (2-b)^2$

$225 = 81 + (2-b)^2$

$\sqrt{144} = (2-b)^2$

$\pm 12 = 2 - b$

$b = 2 \pm 12$

$12 = 2 - b$

$b = -10$

$-12 = 2 - b$

$b = 14$

5. d = $\sqrt{37}$; (-5, 3) and (b, 2)

$x_1\ y_1 \quad x_2\ y_2$

$\Delta x = b + 5$

$\Delta y = 2 - 3 = -1$

$\sqrt{37}^2 = (b+5)^2 + (1)^2$

$37 = (b+5)^2 + 1$

$\sqrt{36} = \sqrt{(b+5)^2}$

$\pm 6 = b + 5$

$b = \pm 6 + 5$

$\boxed{b = 11, -1}$

Find the midpoint of the line segment with the given endpoints.

6. (14, 3) and (6, 9)

*Find avg. of x and y-values

$\frac{14+6}{2}, \frac{3+9}{2}$

$M(10, 6)$

7. (0, 9) and (-4, -6)

$\frac{-4}{2}, \frac{9-6}{2}$

$M(-2, -3/2)$

8. (-11, -2) and (2, -5)

$\frac{-11+2}{2}, \frac{-2-5}{2}$

$M(-9/2, -7/2)$

The midpoint and endpoint of a line segment are given. Find the other endpoint.

9. Midpoint (-3, 5) and Endpoint (-8, 2)

E_1 2 8 +3

+5

M (-3 5)

+5 +3

E_2 -8 2

$\boxed{(6, -2)}$

10. Midpoint (2.5, -6) and Endpoint (-1, -10)

6 -2 +4

+3.5

M 2.5 -6

3.5 +4

-1 -10

Perimeter and Area of Triangles and Rectangles on a Coordinate Plane

1. Find the Perimeter of the triangle

*Find distance of each side, total the sides

$AB^2 = (1--3)^2 + (3-1)^2 = 4^2 + 2^2 = 20$

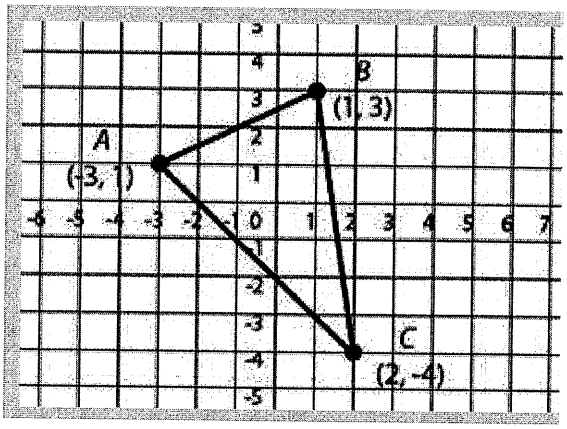
$AB = \sqrt{20}$

$BC^2 = (2-1)^2 + (-4-3)^2 = 1^2 + 7^2 = 50$

$BC = \sqrt{50}$

$AC^2 = (2--3)^2 + (-4-1)^2 = 5^2 + 5^2 = 50$

$AC = \sqrt{50}$



Perimeter $= \sqrt{20} + \sqrt{50} + \sqrt{50}$

$\approx \boxed{18.614}$

2. Find the Perimeter and the area of the rectangle

$AB^2 = (-1+3)^2 + (2--4)^2 = 2^2 + 6^2 = 40$

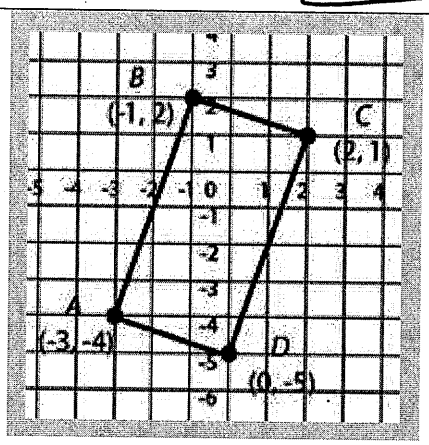
$AB = \sqrt{40}$

$BC^2 = (2--1)^2 + (1-2)^2 = 3^2 + 1^2 = 10$

$BC = \sqrt{10}$

Area = length × width

$= (\sqrt{10}) \times \sqrt{40} = \boxed{20}$



Perimeter $= \sqrt{40} + \sqrt{40} + \sqrt{10} + \sqrt{10} = \boxed{18.974}$

Area $= \boxed{20}$

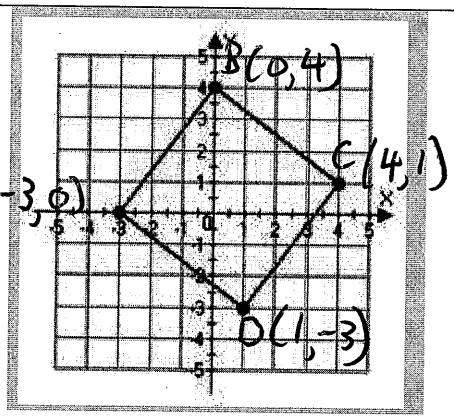
3. Find the Perimeter and the area of the square

$AB^2 = (0+3)^2 + (4-0)^2 = 9 + 16 = 25$

$AB = \sqrt{25} = 5$

Perimeter $= 5+5+5+5 = \boxed{20}$

Area $= (\text{length})^2 = 5^2 = \boxed{25}$



Find the distance between each pair of points. $d^2 = \Delta x^2 + \Delta y^2$

4. (-4, 5), (2, 3)

$d^2 = (2 - -4)^2 + (3-5)^2 = 6^2 + 2^2$

$d^2 = 40$

$d = \sqrt{40} = \boxed{2\sqrt{10}}$

5. (0, -7), (3, -1)

$d^2 = (3-0)^2 + (-1+7)^2 = 9 + 36 = 45$

$d = \sqrt{45} \boxed{= 3\sqrt{5}}$

Find the possible values for a given the distance between the 2 points:

6. d = 5 ; (3, 5) and (a, 8)

$5^2 = (a-3)^2 + (8-5)^2$

$25 = (a-3)^2 + 3^2$

$25 = (a-3)^2 + 9$

$16 = (a-3)^2$

$\pm\sqrt{16} = \sqrt{(a-3)^2}$

$\pm 4 = a - 3$

$3 \pm 4 = a$

$\boxed{a = 7, -1}$

7. d = $\sqrt{10}$; (5,a), (6,1)

$\sqrt{10}^2 = (6-5)^2 + (1-a)^2$

$10 = 1 + (1-a)^2$

$9 = (1-a)^2$

$\pm\sqrt{9} = \sqrt{(1-a)}$

$\pm 3 = 1 - a$

$a = 1 \pm 3$

$\boxed{a = 4, -2}$

Find the midpoint of the line segment with the given endpoints. $M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

8. (1, -10), (-7, -6)

$M\left(\frac{1-7}{2}, \frac{-10-6}{2}\right)$

$M(-3, -8)$

9. (10, 8), (10, 7)

$M\left(\frac{10+10}{2}, \frac{8+7}{2}\right)$

$M(10, 15/2)$

Find the other endpoint of the line segment with the given endpoint and midpoint.

10. Endpoint: (5, -4), midpoint: (-4, 3)

$$\begin{array}{c} +9 \\ M \\ -9 \end{array} \begin{bmatrix} 5 & 10 \\ -4 & 3 \\ \boxed{-13} & -4 \end{bmatrix} \begin{array}{c} 7 \\ \\ 7 \end{array}$$

Endpt 2: (-13, 10)

11. Endpoint: (-5, 4), midpoint: (6, 3)

$$\begin{array}{c} 11 \\ M \\ 11 \end{array} \begin{bmatrix} 17 & 4 \\ 6 & 3 \\ -5 & 2 \end{bmatrix} \begin{array}{c} 1 \\ \\ 1 \end{array}$$

Endpoint: (17, 2)