Pre-Calculus Name: Date: Period:

1.2 Distance Formula

Notes

Refer to the graph to the right.

1. What are the coordinates of points P and Q?

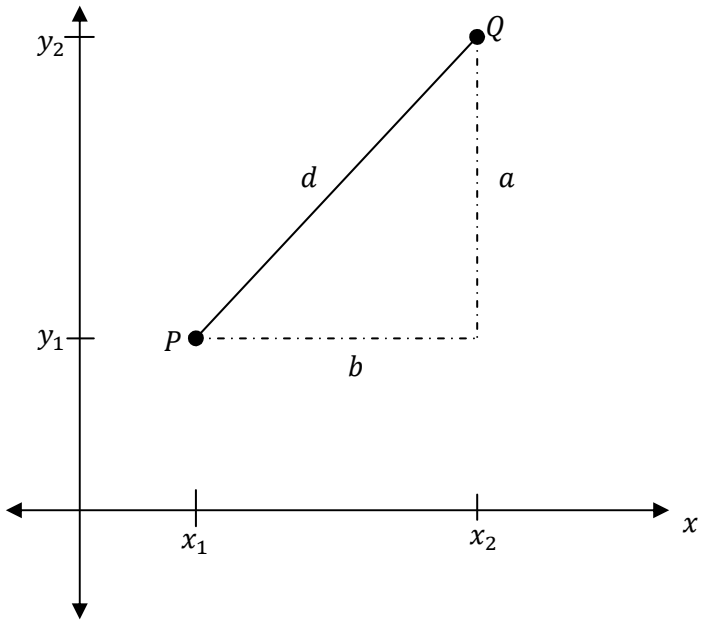
   P: (,) Q(,)

2. Use the coordinates to write an expression for the vertical distance a and the horizontal distance b.

   $a =$

   $b =$

3. Use the Pythagorean Theorem to write an equation and solve for d in terms of a and b.



4. Substitute your equations from (2) for a and b to get you final distance formula.

The Distance Formula:

Try these:

Use the distance formula for the following. Keep answers in simplest radical form.

a) Find the distance between $(-3,7)$ and $(6,4)$.

b) If $A(-3,7)$ and $B(x,-1)$, find the value of x that makes $AB = 10$.

c) Find the coordinates of the point on the line $x = 8$ that is 5 units from the point (3,7).

d) Find the coordinates of the point on the line $y = 4$ that is 12 units from the point (3,7).

e) Find the coordinates of the point on the line $y = 4$ that is 2 units from the point (3,7).
Explain your answer.

f) Find the possible coordinates of a point (if it exists) on the line $y = x$ that is 12 units from the point (0,3).
(Hint: the coordinates of any point on the line $y = x$ can be written as (x, x).)

g) Find the possible coordinates of a point on the line $y = x + 1$ that is 7 units from (1,0).

Pre-Calculus Name: Date: Period:

1.2 Distance Formula

Assignment

For each of the following, leave your answers in simplest radical form.

1. Find the distance between $(3, -2)$ and $(-5,10)$.

2. Find the distance between $(4, -6)$ and $(12, -2)$.

3. Find the value of y if $PQ = 17$ with the points $P(-4,5)$ and $Q(4, y)$.

4. Find the value of x if $AB = 7$with the points $A(2,3)$, and $B(x, 4)$.

5. Find the possible coordinates of a point on the line $y = -5$ that is $\sqrt{2}$ units from the point $(-4,2)$.

6. Find the possible coordinates of a point on the line $y = x$ that is 5 units from the point $(0,6)$.

7. Find the possible coordinates of the point (if it exists) on the line $y = x - 4$ that is 4 units from the point $(2, -6)$.

8. *Challenge :* Find the coordinates of the two points on the line $y = x + 5$ that are $\sqrt{3}$ units from the point $(3,6)$. *Hint: you will need to solve a quadratic equation.*