Bell Work

1) Find the middle of the following pairs of numbers. (average)

2) Find the distance between the numbers.

1) 3, 7

2) -4, 5

10.3 Circles

Circle - the set of all points equidistance from the center

The distance from the center to the outer edge is the radius.

distance formula:

\[ d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \]

useful for describing a circle in the coordinate plane

Midpoint Formula:

finds the exact middle of two points

\[ \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \]

Find the midpoint of:

1) (-5,6) and (2,0) \( \left( \frac{-5 + 2}{2}, \frac{6 + 0}{2} \right) = \left( \frac{-3}{2}, 3 \right) \)

2) (-7,-4) and (9,-10) \( \left( \frac{-7 + 9}{2}, \frac{-4 + (-10)}{2} \right) = \left( \frac{2}{2}, \frac{-14}{2} \right) \)

Chapter 10 Conic Sections

Conic section - intersection of a plane and a double cone

The 4 possible outcomes:

Circle  Parabola  Hyperbola

Equation of a circle

\[ (x - h)^2 + (y - k)^2 = r^2 \]

Find the distance between the following points:

1) (0,0) and (3,4)

\[ d = \sqrt{(3-0)^2 + (4-0)^2} \]

\[ d = \sqrt{9 + 16} \]

\[ d = \sqrt{25} \]

\[ d = 5 \]

2) (-2,-3) and (4,3)

\[ d = \sqrt{(4 - (-2))^2 + (3 - (-3))^2} \]

\[ d = \sqrt{6^2 + 6^2} \]

\[ d = \sqrt{36 + 36} \]

\[ d = \sqrt{72} \]

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Writing the equation of a circle

Standard equation of a circle

1) Write the standard equation of a circle with center \((4, -1)\) and radius of \(r = 6\)

\[(x - h)^2 + (y - k)^2 = r^2\]

\[(-4)^2 + (y + 1)^2 = 36\]

2) Write the standard equation of a circle with center \((-1, -5)\) and radius of \(r = 3.2\)

\[(x + 1)^2 + (y + 5)^2 = 10.24\]

Find the center of the circle and the radius given the equation of the circle.

\[(x - h)^2 + (y - k)^2 = r^2\]

Center \((h, k)\)

Radius \(r\)

\[(x - 1)^2 + (y + 3)^2 = 25\]

Center \((1, -3)\)

Radius \(5\)

Write the equation of the circle \(x^2 + y^2 = r^2\) translated

Write the equation of the circle \(x^2 + y^2 = 7^2\) translated:

Center \((0, 0)\)

Radius \(7\)

a) 4 units left

3 units up

New equation is:

\[(x + 4)^2 + (y - 3)^2 = 7^2\]

b) 5 units right

3 units down

New equation is:

\[(x - 5)^2 + (y + 3)^2 = 8^2\]

Graphing a Circle

Given the graph find the center and the radius of the circle and write the equation.

Given: \((x + 1)^2 + (y - 3)^2 = 25\)

Center \((-1, 3)\)

Radius \(5\)
Distance Formula: \[ d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2} \]

Given the two points, find the distance between them.

\[
\begin{align*}
(2,4) & \quad \text{Center} \\
(5,8) & \quad \text{Point on the circle}
\end{align*}
\]

\[ d = \sqrt{(5-2)^2 + (8-4)^2} \\
= \sqrt{3^2 + 4^2} \\
= \sqrt{9 + 16} \\
= \sqrt{25} \\
= 5
\]

The distance between the center and a point on the circle is the radius.

Class work:

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Homework:

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Class work:

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