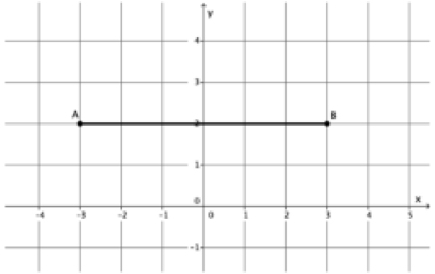
Lesson 17: Distance on the Coordinate Plane

Classwork

Example 1

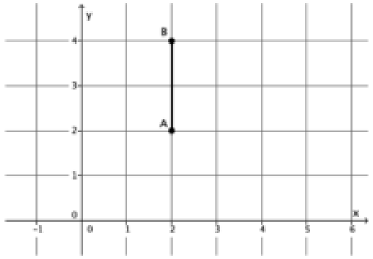
What is the distance between the two points A and B on the coordinate plane?

$\overline{AB}$ = 6 units



What is the distance between the two points A and B on the coordinate plane?

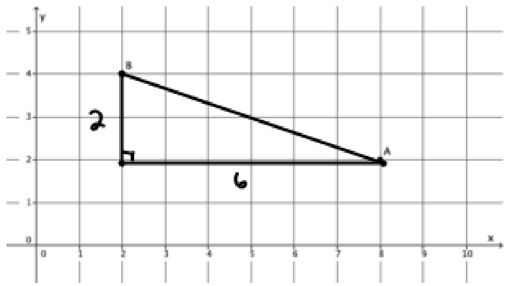
$\overline{AB}$ = 2 units



When points are diagonal, use them to make a right triangle.

What is the distance between the two points A and B on the coordinate plane? Round your answer to the tenths place.

$a^2+b^2=c^2$
$2^2+6^2=c^2$
$4+36=c^2$
$40=c^2$
$\sqrt{40}=c$
$6.3\approx c$



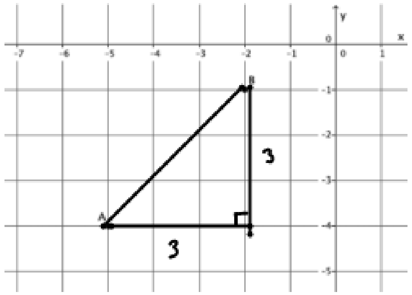
$\sqrt{40}=\sqrt{4\times 10}$
$=2\sqrt{10}$

$\overline{AB}\approx 6.3$ units

Example 2

Given two points A and B on the coordinate plane, determine the distance between them. First, make an estimate; then, try to find a more precise answer. Round your answer to the tenths place.

$a^2+b^2=c^2$
$3^2+3^2=c^2$
$9+9=c^2$
$18=c^2$
$\sqrt{18}=c$
$4.2\approx c$



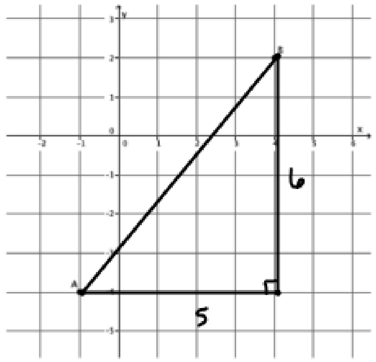
$\sqrt{18}=\sqrt{9\times 2}$
$=3\sqrt{2}$

$\overline{AB}\approx 4.2$ units

Exercises 1–4

For each of the Exercises 1–4, determine the distance between points A and B on the coordinate plane. Round your answer to the tenths place.

1.



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

$6^2+5^2=c^2$

$36+25=c^2$

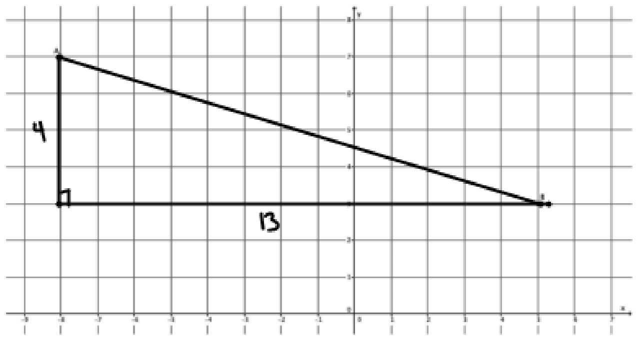
$61=c^2$

$\sqrt{61}=c$

$7.8\approx c$

$\overline{AB}\approx 7.8$ units

2.



$\overline{AB}\approx 13.7$ units

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

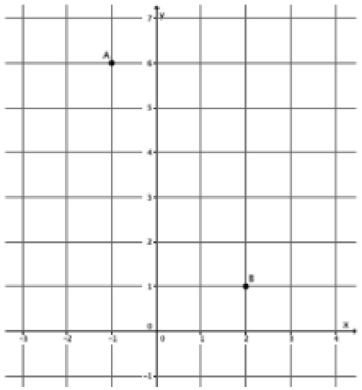
$4^2+13^2=c^2$

$16+169=c^2$

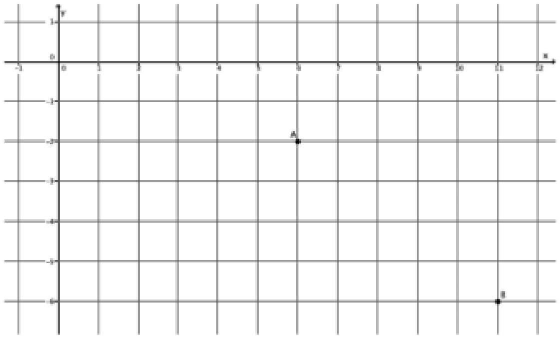
$c^2=185$

$c\approx 13.7$

3.

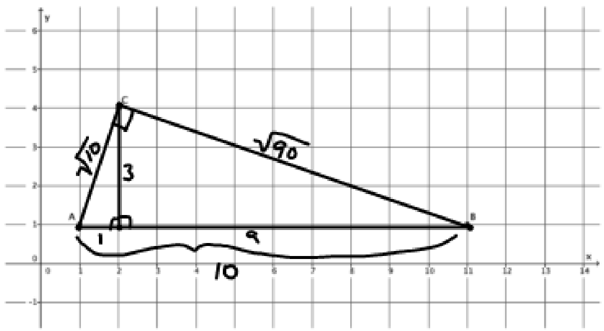


4.



Example 3

Is the triangle formed by the points A, B, C a right triangle?



$\overline{AC}$

$1^2+3^2=c^2$

$1+9=c^2$

$10=c^2$

$\sqrt{10}=c$

$\overline{BC}$

$3^2+9^2=c^2$

$9+81=c^2$

$90=c^2$

$\sqrt{90}=c$

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

$(\sqrt{10})^2+(\sqrt{90})^2 \stackrel{?}{=} 10^2$

$10+90=100$

$100=100$

This is a right triangle

Lesson Summary

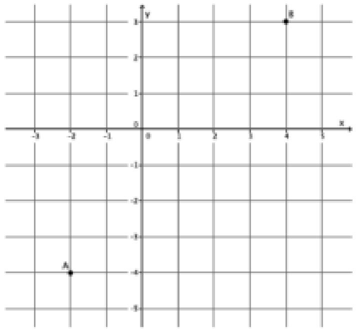
To determine the distance between two points on the coordinate plane, begin by connecting the two points. Then, draw a vertical line through one of the points and a horizontal line through the other point. The intersection of the vertical and horizontal lines forms a right triangle to which the Pythagorean theorem can be applied.

To verify if a triangle is a right triangle, use the converse of the Pythagorean theorem.

Problem Set

For each of the Problems 1–4, determine the distance between points A and B on the coordinate plane. Round your answer to the tenths place.

1.



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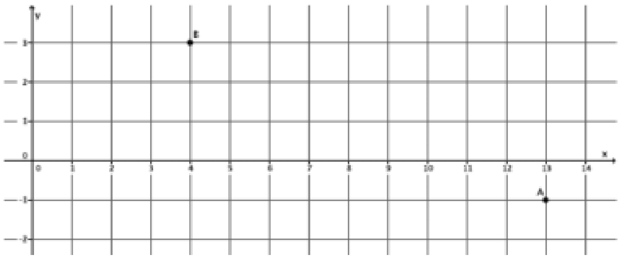
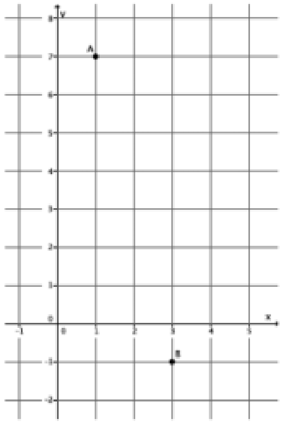
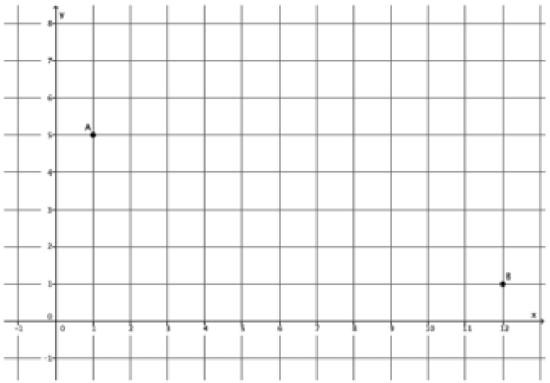


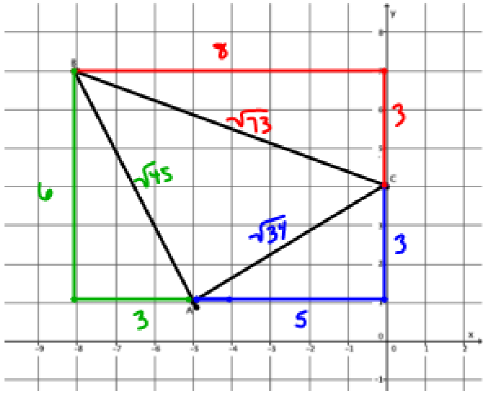
3.



4.



5. Is the triangle formed by points A, B, C a right triangle?



$3^2 + 8^2 = c^2$

$9 + 64 = c^2$

$73 = c^2$

$\sqrt{73} = c^2$

$3^2 + 5^2 = c^2$

$9 + 25 = c^2$

$34 = c^2$

$\sqrt{34} = c$

$6^2 + 3^2 = c^2$

$36 + 9 = c^2$

$45 = c^2$

$\sqrt{45} = c$

$a^2 + b^2 \stackrel{?}{=} c^2$

$(\sqrt{45})^2 + (\sqrt{34})^2 \stackrel{?}{=} (\sqrt{73})^2$

$45 + 34 \stackrel{?}{=} 73$

$79 \neq 73$

This is not a right triangle