GRADE 7 ACCELERATED · UNIT 6 · LESSON 5

Distance on the Coordinate Plane

MA.8.GR.1.2

I can find the distance between two points: subtract on a line, and draw the right triangle when the segment is slanted.

Warm-Up

1. A 25-ft ladder reaches 20 ft up a wall. How far out is its foot?
2. Do sides of 12, 35 and 37 make a right triangle?
3. A map's scale is 1 cm : 5 km. Towns 3.4 cm apart are how far?
4. How far apart are $(2, 5)$ and $(2, -3)$?

Warm-Up

1. A 25-ft ladder reaches 20 ft up a wall. How far out is its foot?

   15 ft

2. Do sides of 12, 35 and 37 make a right triangle?

   Yes — $144 + 1{,}225 = 1{,}369 = 37^2$

3. A map's scale is 1 cm : 5 km. Towns 3.4 cm apart are how far?

   17 km

4. How far apart are $(2, 5)$ and $(2, -3)$? **8**

Vocabulary

horizontal distance

between two points with the same y: the difference of the x's

vertical distance

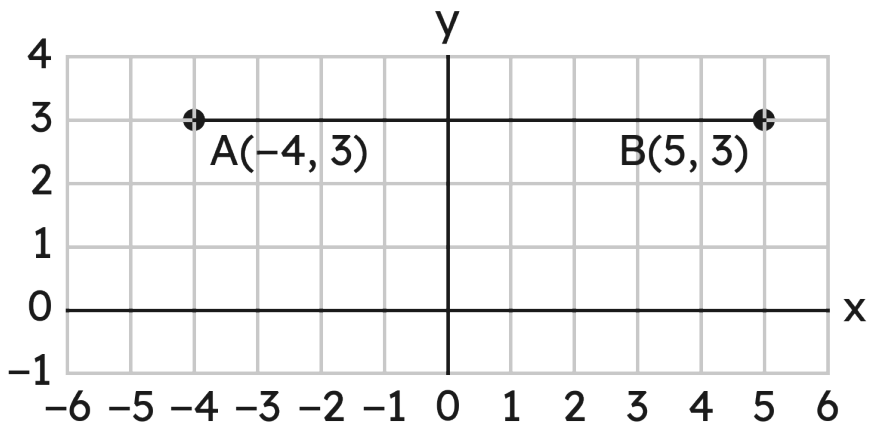
between two points with the same x: the difference of the y's

legs on the grid

the horizontal and vertical segments under a slanted one; the slanted segment is the hypotenuse

Notes

I. On one line: subtract — and across zero, add

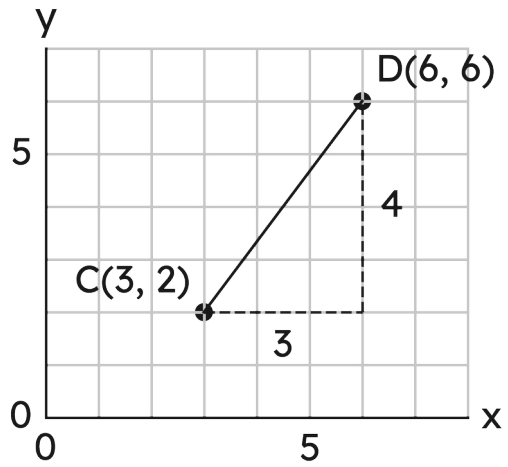


Same y: subtract the x's. Same x: subtract the y's.

$5 - (-4) = 9$: across zero, 4 and 5 add.

Notes

II. Slanted: draw the right triangle

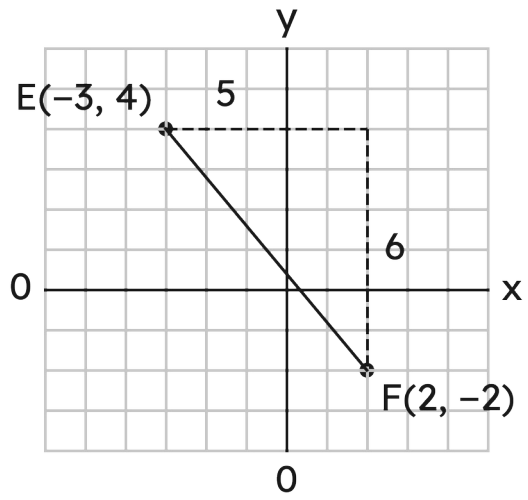


$$c^2 = 3^2 + 4^2 = 25, \quad c = 5$$

The legs are the across and the up. The distance is the hypotenuse.

Notes

III. The legs come from the coordinates



across $2-(-3)=5$ down $4-(-2)=6$

$$c^2 = 25 + 36 = 61,\ c = \sqrt{61} \approx 7.8$$

Example 1

Find the distance between $(-6, -2)$ and $(-6, 7)$.

Example 1

$$7 - (-2) = 9$$

$$2 + 7 = 9$$

Answer: 9 units

Your Turn

Find the distance between $(-3, 5)$ and $(8, 5)$.

Your Turn

Find the distance between $(-3, 5)$ and $(8, 5)$.

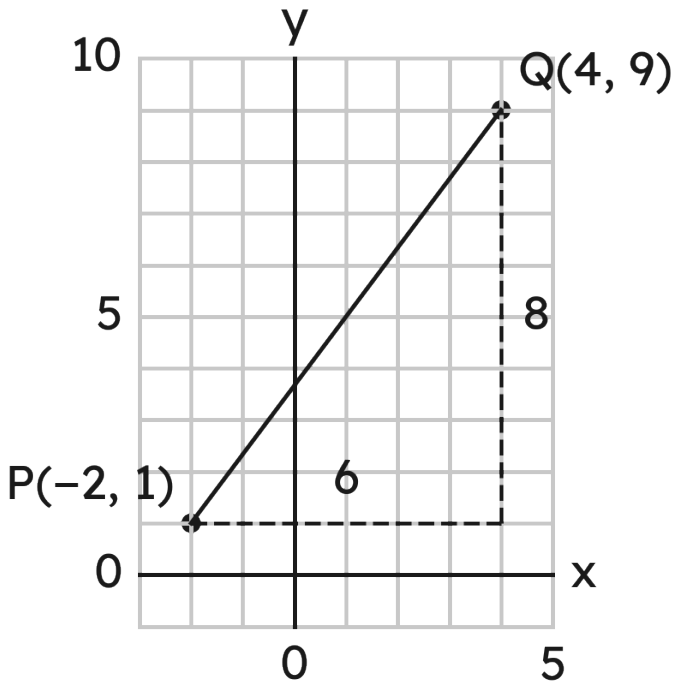
$$8 - (-3) = 11$$

check: $3 + 8 = 11$

Answer: 11 units

Example 2

Find the distance between $(-2, 1)$ and $(4, 9)$.



Example 2

$4 - (-2) = 6, \quad 9 - 1 = 8$

$c^2 = 36 + 64 = 100$

$c = \sqrt{100} = 10$

Answer: 10 units

Your Turn

Find the distance between $(-5, -3)$ and $(2, 1)$, to the nearest tenth.

Your Turn

Find the distance between $(-5, -3)$ and $(2, 1)$, to the nearest tenth.

$$\text{across} \quad 2 - (-5) = 7, \quad \text{up} \quad 1 - (-3) = 4$$

$$c^2 = 49 + 16 = 65, \quad c = \sqrt{65} \approx 8.1$$

Answer: $\sqrt{65} \approx 8.1$ units

Whiteboards · Question 1 of 9

How far apart are $(-7, -4)$ and $(-7, 6)$?

Answer it.

Whiteboards · Question 1 of 9

How far apart are $(-7, -4)$ **and** $(-7, 6)$**?**

$$6 - (-4) = 10$$

Answer: 10 units

Whiteboards · Question 2 of 9

How far apart are $(-9, 2)$ and $(3, 2)$?

Answer it.

Whiteboards · Question 2 of 9

How far apart are $(-9, 2)$ **and** $(3, 2)$**?**

$$3 - (-9) = 12$$

Answer: 12 units

Whiteboards · Question 3 of 9

What is the distance between $(-5, 1)$ and $(3, 1)$?

A. 9

B. 8

C. 2

D. −8

Answer it.

Whiteboards · Question 3 of 9

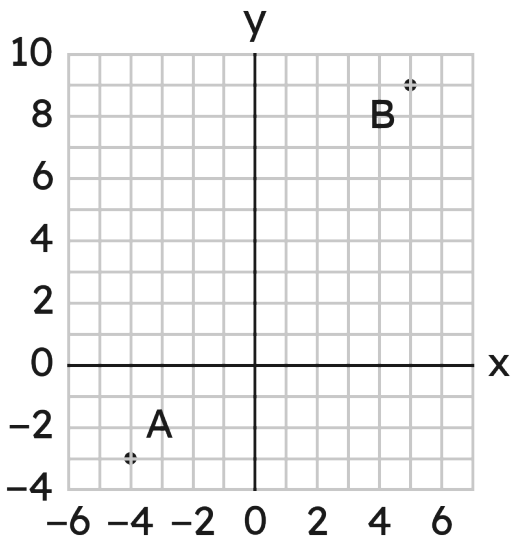
What is the distance between $(-5, 1)$ and $(3, 1)$?

$$3 - (-5) = 8$$

Answer: B — 8 units

Whiteboards · Question 4 of 9

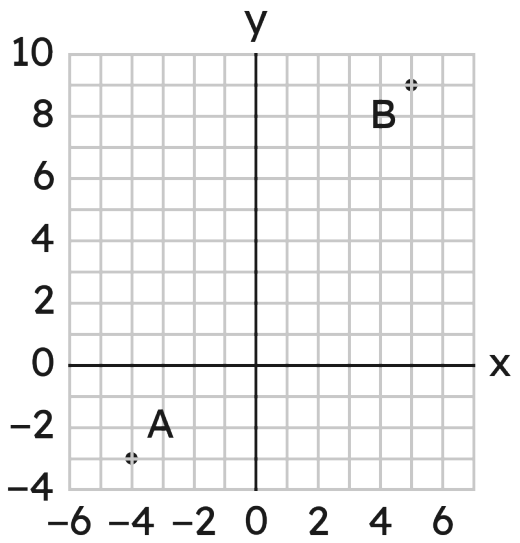
How far apart are $A(-4, -3)$ **and** $B(5, 9)$**?**



Answer it.

Whiteboards · Question 4 of 9

How far apart are $A(-4, -3)$ **and** $B(5, 9)$**?**



across 9, up 12

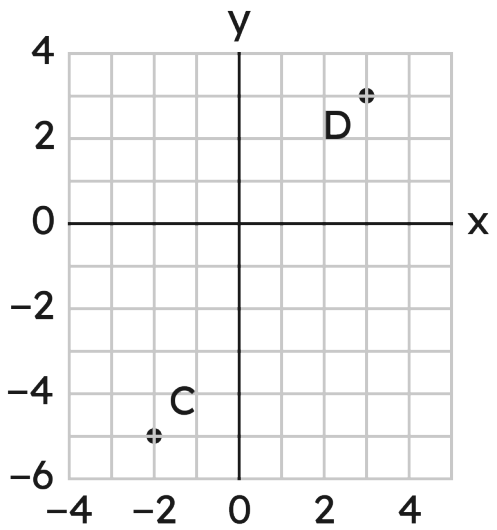
$c^2 = 81 + 144 = 225$

$c = 15$

Answer: 15 units

Whiteboards · Question 5 of 9

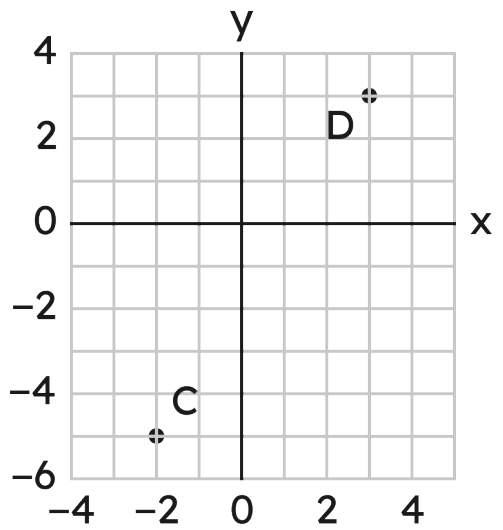
How far apart are $C(-2, -5)$ and $D(3, 3)$, to the nearest tenth?



Answer it.

Whiteboards · Question 5 of 9

How far apart are $C(-2, -5)$ and $D(3, 3)$, to the nearest tenth?



across 5, up 8

$c^2 = 25 + 64 = 89$

$c = \sqrt{89} \approx 9.4$

Answer: $\sqrt{89} \approx 9.4$ units

Whiteboards · Question 6 of 9

Which gives the distance between $(4, 5)$ and $(-3, -1)$?

A. $\sqrt{1^2 + 6^2}$

B. $\sqrt{4^2 + 5^2}$

C. $\sqrt{7^2 + 6^2}$

D. $7 + 6$

Answer it.

Whiteboards · Question 6 of 9

Which gives the distance between $(4, 5)$ and $(-3, -1)$?

across $4 - (-3) = 7$, up $5 - (-1) = 6$

$$\sqrt{7^2 + 6^2} = \sqrt{85}$$

Answer: C — $\sqrt{(7^2 + 6^2)} = \sqrt{85}$

Whiteboards · Question 7 of 9

How far is $(5, -12)$ from the origin?

Answer it.

Whiteboards · Question 7 of 9

How far is $(5, -12)$ from the origin?

across 5, down 12

$c^2 = 25 + 144 = 169$, $c = 13$

Answer: 13 units

Whiteboards · Question 8 of 9

On a town map in miles, the school is at $(-3, 2)$, the library at $(4, 2)$ and the town hall at $(0, 5)$.

How far is the school from the library?

Answer it.

Whiteboards · Question 8 of 9

On a town map in miles, the school is at $(-3, 2)$, the library at $(4, 2)$ and the town hall at $(0, 5)$.

How far is the school from the library?

$$4 - (-3) = 7$$

Answer: 7 mi

Whiteboards · Question 9 of 9

Ty says $(-3, 0)$ and $(7, 0)$ are 4 units apart.

What did he do? What is the distance?

Write your answer in sentences.

Whiteboards · Question 9 of 9

Ty says $(-3, 0)$ and $(7, 0)$ are 4 units apart.

What did he do? What is the distance?

$$7 - (-3) = 10$$

check: $3 + 7 = 10$

Answer: He subtracted 7 – 3. Across zero the pieces add: 10 units.

Independent Set

1. Find the distance between $(-6, 3)$ and $(7, 3)$.
2. Find the distance between $(5, -7)$ and $(5, 4)$.
3. Find the distance between $(-7, 1)$ and $(5, -4)$.
4. Find the distance between $(-2, 5)$ and $(1, -2)$, to the nearest tenth.
5. How far is $(-4, 9)$ from the origin, to the nearest tenth?
6. On a map in kilometers, a pool is at $(-2, -3)$ and a park at $(8, 8)$. How far apart are they in a straight line, to the nearest tenth of a kilometer?

IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 67. Due by the Unit 6 test.

Today's skills — all required

Find the distance between two points on a horizontal or vertical line — L9V
Find the distance between two points — ZBP