



DEPARTMENT OF EDUCATION

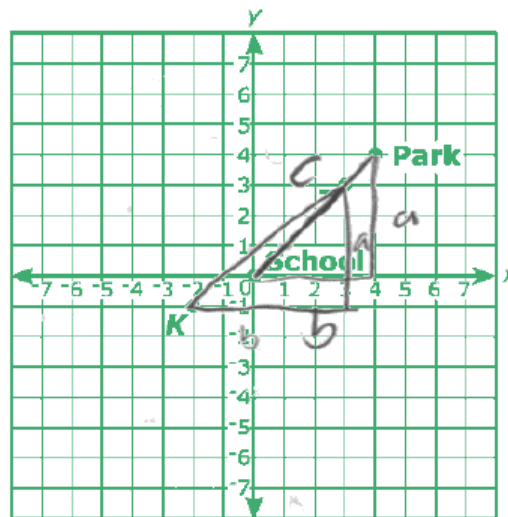
*Working Together for Student Success*

# **ISTEP+ Grade 10 Math**

## **Anchors**

# Student Response 1

The coordinate grid shows the location of a school and a park. Point K represents the location of Kim's home, and point T represents the location of Tim's home.



$K = Kim$   
 $T = Tim$   
 $a = 4 \quad b = 4$

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

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

$$16 + 16 = c^2$$

$$32 = c^2$$

**Part A**  $\sqrt{32} = c$

What is the shortest distance between the school and the park on the grid? Round your answer to the nearest tenth of a unit. Use words, numbers, and/or symbols to explain how you found your answer.

$a^2 + b^2 = c^2$  ← Pythagorean formula for right triangles legs

$a = 4 \quad b = 4$

$$4^2 + 4^2 = c^2 \quad 16 + 16 = c^2 \quad 32 = c^2$$

$$\sqrt{32} = c \quad c = 5.7657 \quad \textcircled{5.7}$$

**Distance:** 5.7 units

### Part B

Tim claims that the distance from the school to the park is the same as the distance from Kim's home to Tim's home. Use words, numbers, and/or symbols to explain whether he is correct.

$$\begin{aligned} a^2 + b^2 &= c^2 & a &= 4 & b &= 5 \\ 4^2 + 25^2 &= c^2 & 16 + 25 &= c^2 & 41 &= c^2 \\ \sqrt{41} &= c & c &= 6.403 & & \\ \text{distance Kim to Tim} & 6.4 & \neq & 5.7 & \sqrt{\phantom{x}} & \text{distance park to school} \end{aligned}$$

(6.4) He is not correct

### Content - 2 pts

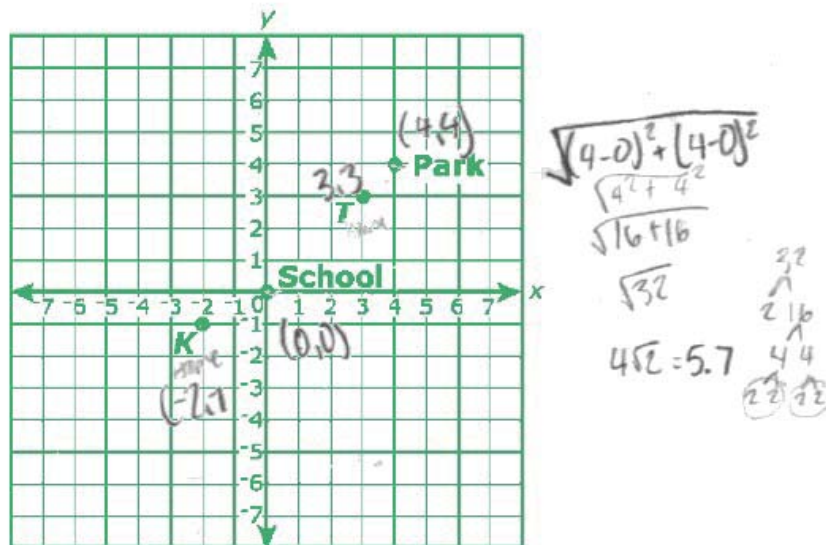
The response indicates a thorough understanding of the mathematical concepts in the task. In Part A, the response gives the correct value of 5.7 units. In Part B, the response states that Tim is incorrect and shows that the distance between Kim's home and Tim's home is greater than the distance between the school and the park.

### Process - 2 pts

The response indicates a thorough understanding of the mathematical processes related to the task. The process in Part A uses the Pythagorean Theorem correctly to find the correct value (5.7) for the distance between the school and the park. The process in Part B uses the Pythagorean Theorem correctly to find the correct value (6.4) for the distance between Kim's home and Tim's home.

## Student Response 2

The coordinate grid shows the location of a school and a park. Point K represents the location of Kim's home, and point T represents the location of Tim's home.



### Part A

What is the shortest distance between the school and the park on the grid? Round your answer to the nearest tenth of a unit. Use words, numbers, and/or symbols to explain how you found your answer.

The shortest distance between the school and the park on the grid is 5.7 units. I found my answer by plugging in the coordinates of the school, (0,0), and the park, (4,4), into the distance formula,  $\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$ .

Distance: 5.7 units

## Part B

Tim claims that the distance from the school to the park is the same as the distance from Kim's home to Tim's home. Use words, numbers, and/or symbols to explain whether he is correct.

The distance from the school to the park is not the same as the distance from Kim's to Tim's home, proving Tim wrong. Just like the distance from the school to the park, I plugged in the coordinates for Kim's and Tim's house into the distance formula.

Park  $\rightarrow$  School  
5.7 units

K  $\rightarrow$  T  
6.7 units

$$\begin{array}{cc} K & T \\ (2, -1) & (3, 3) \end{array}$$

---

$$\sqrt{(3 - (-1))^2 + (3 - (-1))^2}$$
$$\sqrt{4^2 + 4^2}$$
$$\sqrt{16 + 16}$$
$$\sqrt{32}$$
$$3\sqrt{8} = 6.7$$

45  
^  
5 9  
^  
33

### Content - 2 pts

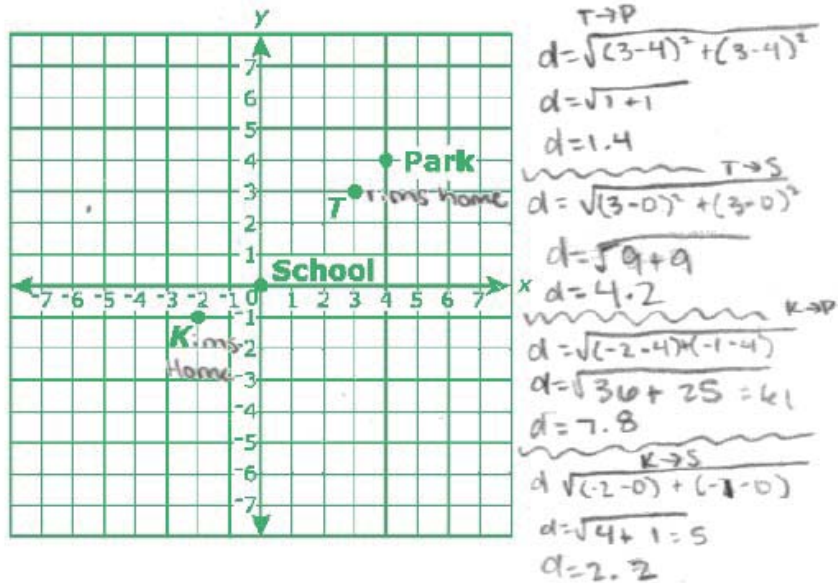
The response indicates a thorough understanding of the mathematical concepts in the task. In Part A, the response gives the correct value of 5.7 units. In Part B, the response states that Tim is incorrect and shows that the distance between Kim's home and Tim's home is greater than the distance between the school and the park.

### Process - 1 pt

The response indicates a partial understanding of the mathematical processes related to the task. The process in Part A uses the distance formula correctly to find the correct value for the distance between the school and the park. The process in Part B uses the distance formula with a minor error to arrive at the distance of 6.7 in lieu of 6.4 for the distance between Kim's home and Tim's home.

## Student Response 3

The coordinate grid shows the location of a school and a park. Point  $K$  represents the location of Kim's home, and point  $T$  represents the location of Tim's home.



### Part A

What is the shortest distance between the school and the park on the grid? Round your answer to the nearest tenth of a unit. Use words, numbers, and/or symbols to explain how you found your answer.

The closest distance is Tim's house. His combined distance was 5.6. Kim's combined was 10.

Distance: 5.6 units

### Part B

Tim claims that the distance from the school to the park is the same as the distance from Kim's home to Tim's home. Use words, numbers, and/or symbols to explain whether he is correct.

No, this is incorrect. The distance from the school to the park is only 5.7. The distance from Kim's house to Tim's house is 6.4.

$$d_{\text{S to P}} = \sqrt{(0-4)^2 + (0-4)^2}$$

$$d = \sqrt{16 + 16} = 32$$

$$d = 5.7$$

$$d_{\text{K to T}} = \sqrt{(-2-3)^2 + (-1-3)^2}$$

$$d = \sqrt{25 + 16} = 41$$

$$d = 6.4$$

### Content - 1 pt

The response indicates a partial understanding of the mathematical concepts in the task. In Part A, the response gives an incorrect value of 5.6 units. In Part B, the response states that Tim is incorrect and shows that the distance between Kim's home and Tim's home is greater than the distance between the school and the park.

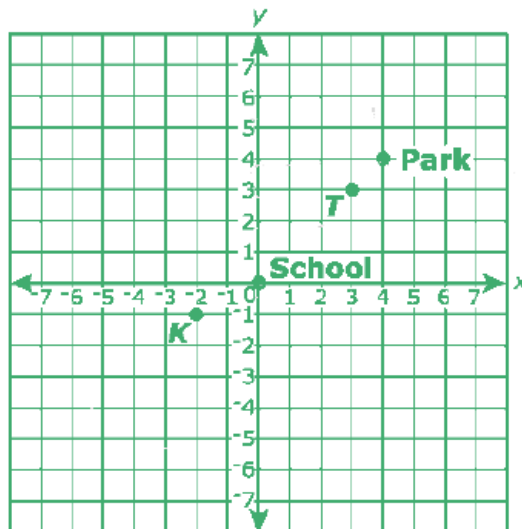
### Process - 2 pts

The response indicates a thorough understanding of the mathematical processes related to the task. The process in Part A uses some form of the distance formula for the distance between the school and the park. The process in Part B uses the distance formula correctly to find the correct value (6.4) for the distance between Kim's home and Tim's home and the correct value (5.7) for the distance between the school and the park.



## Student Response 4

The coordinate grid shows the location of a school and a park. Point  $K$  represents the location of Kim's home, and point  $T$  represents the location of Tim's home.



$$d = \sqrt{(4-0)^2 + (4-0)^2}$$
$$d = \sqrt{16}$$
$$d = 4 \text{ units}$$

### Part A

What is the shortest distance between the school and the park on the grid? Round your answer to the nearest tenth of a unit. Use words, numbers, and/or symbols to explain how you found your answer.

The shortest distance between the school and the park would be 4 units. I found the distance by using the distance formula.

Distance:

4

units



### Part B

Tim claims that the distance from the school to the park is the same as the distance from Kim's home to Tim's home. Use words, numbers, and/or symbols to explain whether he is correct.

No, Tim is not correct. The distance from the school to the park is 4 units. However, from Tim's house to Kim's house is about 6.4 units, meaning they are not the same.

Tim (3,3)

Kim (-2,-1)

School to Park: 4 units

$$d = \sqrt{(3+2)^2 + (3+1)^2}$$

$$d = \sqrt{25 + 16}$$

$$d = \sqrt{41}$$

$$d = 6.4 \text{ units}$$

### Content - 1 pt

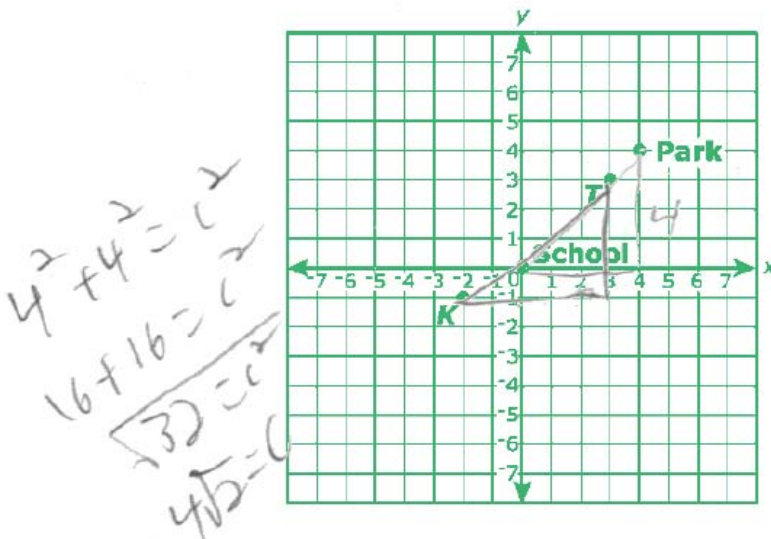
The response indicates a partial understanding of the mathematical concepts in the task. In Part A, the response is incorrect. In Part B, the response states that Tim is incorrect and shows that the distance between Kim's home and Tim's home is greater than the distance between the school and the park

### Process - 1 pt

The response indicates a partial understanding of the mathematical processes related to the task. The process in Part A uses the distance formula with an error to arrive at an incorrect value for the distance between the school and the park. The process in Part B uses the distance formula correctly to find the correct value (6.4) for the distance between Kim's home and Tim's home.

## Student Response 5

The coordinate grid shows the location of a school and a park. Point K represents the location of Kim's home, and point T represents the location of Tim's home.



### Part A

What is the shortest distance between the school and the park on the grid? Round your answer to the nearest tenth of a unit. Use words, numbers, and/or symbols to explain how you found your answer.

The answer was found by finding the lengths of both the legs of a right triangle where the distance is the hypotenuse, then using the Pythagorean theorem.

Distance:

$4\sqrt{2}$

units

### Part B

Tim claims that the distance from the school to the park is the same as the distance from Kim's home to Tim's home. Use words, numbers, and/or symbols to explain whether he is correct.

The distance is not the same because the right triangle made using "K" and "T" was not congruent to the one made with the school and park.

**Content - 0 pts**

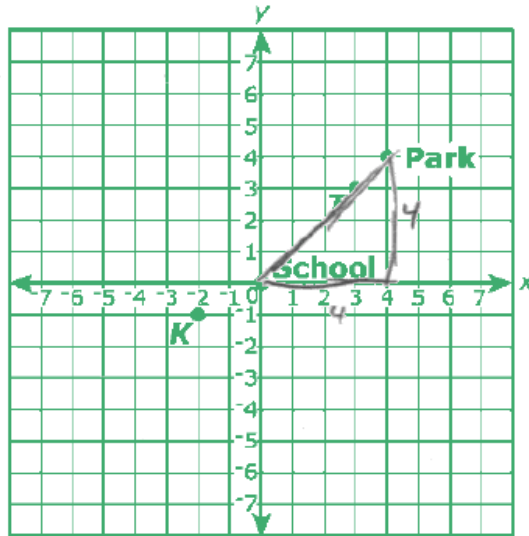
The response indicates a limited understanding of the mathematical concepts in the task. In Part A, the response is correct but is not given in decimal format. In Part B, it is insufficient to say the triangles are congruent.

**Process - 1 pt**

The response indicates a partial understanding of the mathematical processes related to the task. The process in Part A uses the Pythagorean Theorem correctly to find the correct value for the distance between the school and the park. No process is shown for Part B.

## Student Response 6

The coordinate grid shows the location of a school and a park. Point  $K$  represents the location of Kim's home, and point  $T$  represents the location of Tim's home.



### Part A

What is the shortest distance between the school and the park on the grid? Round your answer to the nearest tenth of a unit. Use words, numbers, and/or symbols to explain how you found your answer.

5.6 is correct because you use pythagorean theorem to find the hypotenuse

Distance: 5.6 units

### Part B

Tim claims that the distance from the school to the park is the same as the distance from Kim's home to Tim's home. Use words, numbers, and/or symbols to explain whether he is correct.

no, because the distance from Kim's home to school would be the same as Tim's to the park

#### Content - 0 pts

The response indicates a limited understanding of the mathematical concepts in the task. In Part A, the response is rounded incorrectly to 5.6. In Part B, the response shows a misconception.

#### Process - 0 pts

The response indicates no understanding of the mathematical processes related to the task. No processes are shown for either Part A or Part B.