

PSSA and Keystone Exams
Summer 2023 Workshops

PSSA, Grade 8 Math

Justin Joins a Gym

Handscoring
Anchor Set

1. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A.** What are the slope and the y -intercept of the equation? What do the slope and the y -intercept each represent in this situation?

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B.** How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

Go to the next page to finish question 25.



1. **Continued.** Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from **part A** and the equation from **part B**. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ **not** a possible solution in this situation?



Grade 8 Math
Justin Joins a Gym

Assessment Anchor this item will be reported under:

M08.B-F.2 Use functions to model relationships between quantities.

Specific Anchor Descriptor addressed by this item:

M08.B-F.2.1 Represent or interpret functional relationships between quantities using tables, graphs, and descriptions.

M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods.

Scoring Guide:

Score	In this item, the student –
4	Demonstrates a thorough understanding of using functions to model relationships between quantities by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of using functions to model relationships between quantities by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of using functions to model relationships between quantities by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of using functions to model relationships between quantities.
0	The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question.

Top Scoring Student Response And Training Notes:

Score	Description
4	Student earns 4 points.
3	Student earns 3.0 – 3.5 points.
2	Student earns 2.0 – 2.5 points.
1	Student earns 0.5 - 1.5 points. OR Student demonstrates minimal understanding of using functions to model relationships between quantities.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

A.

What?	Why?
slope: 10 y -intercept: 5	Sample Explanation: The slope represents the monthly charge (of \$10) and the y -intercept represents the joining fee (of \$5). OR equivalent

(2 score points)

½ point for each correct answer

AND

½ point for each correct explanation

B.

What?	Why?
(\$) 20	

(1 score point)

1 point for correct answer

C.

What?	Why?
	Sample Explanation: The point $(-3, -25)$ implies going back in time and receiving money from the gym at the point where the two functions intersect. That is why the point $(-3, -25)$ is not possible in terms of this context. OR equivalent

(1 score point)

1 point for correct and complete explanation

OR ½ point for correct but incomplete explanation

MATHEMATICS

SECTION 2

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y -intercept of the equation? What do the slope and the y -intercept each represent in this situation?

Slope is 10

y -intercept is 5

The slope represents the monthly rate Justin has to pay.

The y -intercept represents the discounted fee to join.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

regular price $y = 15x + 20$

$$y = 15(1) + 20$$

$$y = 15 + 20$$

$$y = 35$$

discounted price

$$y = 10x + 5$$

$$y = 10(1) + 5$$

$$y = 10 + 5$$

$$y = 15$$

∴ Justin saves \$20 the first month

$$\begin{array}{r} 35 \\ - 15 \\ \hline (20) \end{array}$$



MATHEMATICS

SECTION 2



51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

The point $(-3, -25)$ is not a possible solution because both of the numbers are negative. In a real life situation, you can not go a negative amount of months or pay a negative amount of money.

The solution set is saying he is going negative -3 months and paying \$-25. It is just not possible.

MATHEMATICS

SECTION 2

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

The slope is 10, (or $\frac{10}{1}$) This represents the monthly rate, which is also the rate of change. The y-intercept is 5 (0,5) this represents the joining fee, which you pay up front.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

He saves 20 dollars when joining at the discounted price.

MATHEMATICS

SECTION 2

51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

The solution of two functions are when the two lines intersect, in these types of problems a solution is when they both cost the same, but at a different independent variable.

This solution is impossible because you cannot have negative months.

These lines will never intersect in the first quadrant. Thus, it is impossible for the two prices to ever cost the same.

MATHEMATICS

SECTION 2

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

The slope is 10x and y-intercept is 5.

The slope represent the monthly rate and
y-intercept represent the fee to join.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

$$y = 15(1) + 20$$

$$y = 15 + 20$$

$$y = 35$$

$$(35 - 15)$$

$$= \$20$$

$$y = 10x + 5$$

$$y = 10(1) + 5$$

$$y = 10 + 5$$

$$y = 15$$

Justin save \$20 the first month by joining the gym at the discounted price rather than at the regular price.

MATHEMATICS

SECTION 2

51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

$$y = 10x + 5$$

$$-25 = 10(-3) + 5$$

$$-25 = -30 + 5$$

$$-25 = -25$$

$$y = 15x + 20$$

$$-25 = 15(-3) + 20$$

$$-25 = -45 + 20$$

$$-25 = -25$$

The point $(-3, -25)$ that Justin created based on the equation from part A and the equation from part B is not a possible solution in this situation because we can't have negative money or negative time. That's why he needs to find a different point and solution to the system of equations.



MATHEMATICS

SECTION 2



51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

The slope of the equation is 10, and the y-intercept is 5. In this situation, 10 represents how much money the membership costs each month, and 5 represents the initial fee.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

Justin saves \$15 in the first month.

MATHEMATICS

SECTION 2

51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

The point $(-3, -25)$ is not a possible solution in this situation because it is not possible to join the gym for -3 months or pay a total of -25 dollars.

25. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

Slope - 10

y intercept - 5

The slope and y-intercept represent the monthly rate.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

He saves \$20.

25. **Continued.** Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from **part A** and the equation from **part B**. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ **not** a possible solution in this situation?

It is not a possible solution because the numbers are negative.

MATHEMATICS

SECTION 2

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

$y = 10x + 5$
y-int slope initial starting price
monthly fee

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

Justin saves 20 \$ starting the first month.



MATHEMATICS

SECTION 2



51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

because you can't have negative numbers in this equation

MATHEMATICS
SECTION 2

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

The slope is 10 and represents the monthly rate. The y-intercept is 5 and represents the initial fee.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

He pays \$35.

MATHEMATICS

SECTION 2

51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

It is not because it's a negative equation

MATHEMATICS

SECTION 2

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y -intercept of the equation? What do the slope and the y -intercept each represent in this situation? the slope of this particular equation is 10 while the y -intercept is shown by the number 5. The slope and y -intercepts show that Justin is paying 10 dollars a month and being charged 5 bucks extra for the monthly rate.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?
Justin saves 15 dollars.



MATHEMATICS

SECTION 2



51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

- C. Why is the point $(-3, -25)$ not a possible solution in this situation?
this isn't a possible solution because Justin
cant be in debt as soon as he signs up.

MATHEMATICS

SECTION 2

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

S is the slope

and 10 is the y-intercept

10 for the initial fee

5 per month.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

He saves \$20 more on the discounted price.

MATHEMATICS

SECTION 2

51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

because In every situation they
were five \$ off. also It's in
the negative and Just
doesn't match the
equation.

MATHEMATICS

SECTION 2

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

The slope represents how much the gym charges per month. The y-intercept represents the discounted price.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

Justin saves 10 dollars the first month by joining the gym at a discounted price.



MATHEMATICS

SECTION 2



51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

The point $(-3, -25)$ is not a possible solution in this situation because it is a negative point. Justin still has a positive amount of money, so in this case Justin could not use the point $(-3, -25)$ to represent a possible solution to this situation.

MATHEMATICS

SECTION 2

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

10 means how much it costs
5 means how many months he will go

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

He saved \$10 the first time.



MATHEMATICS

SECTION 2



51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

Because -25 is not on the graph.

F

MATHEMATICS

SECTION 2

F

51. Justin is joining a gym. The gym is currently offering a discount on the fee to join and on the monthly rate.

The discounted price, in dollars, the gym charges can be represented by the equation $y = 10x + 5$.

- A. What are the slope and the y-intercept of the equation? What do the slope and the y-intercept each represent in this situation?

$$\text{slope} = 5$$

$$\text{y-intercept} = 10x$$

well the slope shows you that what direction the numbers are going to. Then y-intercept basically shows you how the numbers start.

The regular price, in dollars, the gym charges can be represented by the equation $y = 15x + 20$.

- B. How much money, in dollars, does Justin save the first month by joining the gym at the discounted price rather than at the regular price?

well I think it shows the regular price is \$20. And the discount is \$5 off, so the discounted price would be \$15.00.

MATHEMATICS

SECTION 2

51. *Continued.* Please refer to the previous page for task explanation.

Justin creates a system of equations based on the equation from part A and the equation from part B. The solution to the system of equations is $(-3, -25)$.

C. Why is the point $(-3, -25)$ not a possible solution in this situation?

Because $(-3, -25)$ has nothing to do with this problem. All of the numbers that ended was those. $y = 10x + 5$, $y = 15x + 20$. You see it has nothing to do with $(-3, -25)$