

ISTEP Prompt #4

*Expressions

*Consumerism

*Two-Step Equation

*Proportional Reasoning

1

A student claims that the following expression is equivalent to $22x$.

The student's steps are shown.

Expression: $4(2x + 3) - (6x + 5)$

Step 1: $8x + 3 - 6x + 5$

Step 2: $14x + 8$

Step 3: $22x$

Part A

Describe all errors in the student's work.

In step 1, when using the distributive property there are two mistakes. The first was they didn't multiply 4 by 3 and then did not multiply -1 by the 5. In step 2, instead of subtracting 6x from 8x, they added to get 14x. In step 3, they added unlike terms to get 22x.

Part B

If all of the errors in the student's work are corrected, what will be the final answer.

Show All Work

$$4(2x + 3) - (6x + 5)$$

$$8x + 12 - 6x - 5$$

$$2x + 12 - 5$$

$$2x + 7$$

Answer 2x + 7

- 2** Erin works as a computer support person after school. She earns \$15 per day plus \$0.50 for each computer problem she fixes. Yesterday, Erin earned \$16.50.

Part A

Write an equation that can be used to determine the number of computer problems Erin fixed yesterday. Be sure to define the variable.

Let p represent the number of computer

Define the variable. problems Erin fixed yesterday.

Write an equation. $0.50p + 15 = 16.50$

Part B

How many computer problems did Erin fix yesterday?

Show All Work

$$0.50p + 15 = 16.50$$

$$0.50p + 15 - 15 = 16.50 - 15$$

$$\frac{0.50p}{0.50} = \frac{1.50}{0.50}$$

$$p = 3 \text{ computer problems}$$

Answer 3 computer problems

Part C

Erin is saving the money she earns to buy a game system for \$200. Erin has only saved her earnings from yesterday. She is going to work 10 more days to save for the game system.

How many problems will Erin need to fix per day to be able to buy the game system if she fixes the same number of computer problems each day?

Show All Work $\$200 - \$16.50 = \$183.50$

$$\$183.50 \div 10 \text{ days} = \$18.35 \text{ per day}$$

$$\$18.35 - \$15 \text{ per day} = \$3.35$$

$$\$3.35 \div \$0.50 \text{ per problem} = 6.7$$

Answer 7 problems per day

- 3** Miranda wants to buy 4 of the same shirt. She can buy 4 shirts at 3 different stores. The regular price for each shirt, before tax, at all 3 stores is \$22.50. The sale special for each store is shown below.

Store 1: buy two shirts and get two at 1/2 price

Store 2: 30% off the regular price of each shirt

Store 3: buy three shirts and get one free

How much more, in dollars, would 4 shirts cost, before tax, if they were purchased from Store 1 instead of Store 2?

Show All Work

Store 1

$$.5 \times \$22.50 = \$11.25$$

$$2 \times \$22.50 + 2 \times \$11.25 = \$67.50$$

Store 2

$$30\% \text{ of } \$22.50$$

$$0.30 \times 22.50 = 6.75$$

$$\$22.50 - \$6.75 = \$15.75$$

$$4 \times \$15.75 = \$63$$

$$\$67.50 - \$63 = \$4.50$$

Answer \$ 4.50

Which two stores sell the 4 shirts at the same sale price? Be sure to include the total cost for each store within your answer. Justify your answer using words, numbers, and/or symbols.

Show All Work

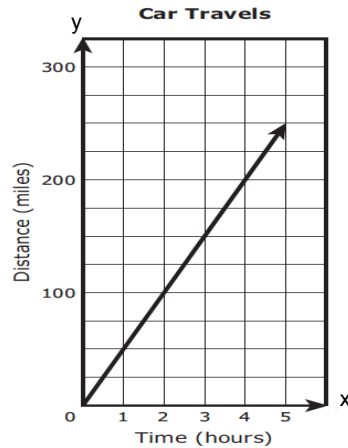
Store 3

$$3 \times \$22.50 = \$66.50$$

$$\$66.50 + 1 \text{ Free} = \$66.50$$

Stores 1 and 3 sell the 4 shirts for the same price (\$67.50)
because at Store 1 buying 2 shirts at half price is the same
as getting the fourth shirt for free.

4 The graph shows the distance in miles (y) a car travels in x hours.



Part A

Explain why the graph does or does not represent a proportional relationship between the variables x and y. Use words, symbols, and/or numbers to justify your decision. If proportional write an equation for the relationship.

The above graph is proportional because it is a straight line through the origin with a constant rate of 50 miles per hour. The equations is $y = 50x$

Two cars leave the same city at the same time and drive in the same direction. The table shows the distances traveled by each car.

Two Cars Travel

Hours of Travel	Miles Traveled by Red Car	Miles Traveled by White Car
1	77	55
2	122	110
3	167	165
4	212	220
5	257	275

Part B

Use the table to determine whether the relationship between the number of hours traveled and the number of miles traveled is proportional for each car. Explain how you determined your answers.

The miles per hours is proportional for the white car when you divide miles by hours you get a constant rate of 55 mph. The red car does not have a constant rate when the miles are divided by hours.

Part C

Describe how the graph of the distance traveled by each car would support your answers.

The graph of the white car is a straight line going through the origin and the unit rate of 55. The line goes through the points: (1, 55), (2, 110). The graph of the red car is not a straight line and does not go through the origin.

- 5** Liz bought a total of 45 black and red dry-erase markers. She spent \$37.50 on black markers and \$1.35 for each red marker. She spent a total \$57.75

Part A

Write an equation that can be used to determine the number of red markers Liz bought. Be sure to define the variable in your equation.

Define the variable Let r represent the number of red markers

Equation $1.35r + 37.50 = 57.75$ Liz bought.

Part B

How many red markers did Liz buy?

Show All Work

$$1.35r + 37.50 = 57.75$$

$$1.35r + 37.50 - 37.50 = 57.75 - 37.50$$

$$\underline{1.35r} = \underline{20.25}$$

$$1.35 \quad 1.35$$

$$r = 15 \text{ red markers}$$

Answer 15 red markers

Part C

How much did each black marker cost?

Show All Work

$$45 - 15 = 30 \text{ black markers}$$

$$\$37.50 \div 30 = \$1.25$$

Answer \$ 1.25