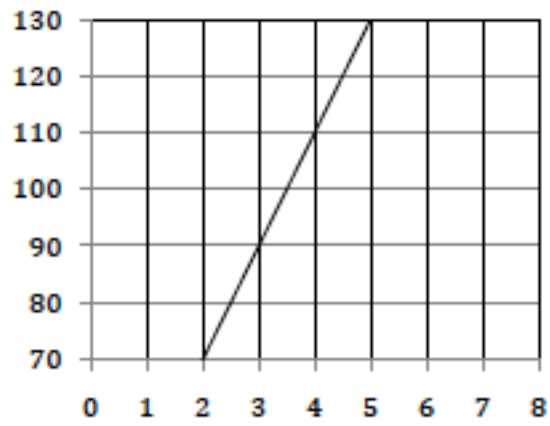Performance Based Assessment:
Equations and Expressions – Grade 8

Name: _____

School: _____

Date: _____

Teacher: _____

1. Does the graph below represent a proportional relationship? Justify your response.

2. Kanye West expects to sell 350,000 albums in one week.

   a. How many albums will he have to sell every day in order to meet that expectation?

   b. West has a personal goal of selling 5 million albums. If he continues to sell albums at the same rate, how long will it take him to achieve that goal? Explain how you made your decision.

   c. The equation y = 40,000x, where x is the number of days and y is the number of albums sold, describes the number of albums another singer expects to sell.
      Does this singer expect to sell more or fewer albums than West? Justify your response.

3. Marvin likes to run from his home to the recording studio. He uses his iPod to track the time and distance he travels during his run. The table below shows the data he recorded during yesterday's run.

| Time (Minute | Distance |
|---|---|
| 5 | 0.833 |
| 10 | 1.660 |
| 15 | 2.545 |
| 20 | 3.332 |
| 25 | 4.003 |
| 30 | 5.012 |
| 35 | 5.831 |

a. Write an algebraic equation to model the data Marvin collected. Explain in words the reasoning you used to choose your equation.

b. Does the data represent a proportional relationship? Explain your reasoning in words.

c. If Marvin continues running at the pace indicated in your equation, how long will it take him to reach the recording studio, which is 12 miles from his home? Use mathematical reasoning to justify your response.

4. Jumel and Ashley have two of the most popular phones on the market, a Droid and an iPhone. Jumel's monthly cell phone plan is shown below, where c stands for the cost in dollars, and t stands for the number of texts sent each month.

Jumel: c = 60 + 0.05t

Ashley's plan costs $.35 per text, in addition to a monthly fee of $45.

a. Whose plan, Jumel's or Ashley's, costs less if each of them sends 30 texts in a month? Explain how you determined your answer.

b. How much will Ashley's plan cost for the same number of texts as when Jumel's costs $75.00?

c. Explain in writing how you know if there is a number of texts for which both plans cost the same amount.

Analyze the two tables below. Identify and explain which table represents a linear relationship that is proportional and the one that it is non-proportional.

# 1 Table of Values

| x | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| y | 0 | 4 | 8 | 12 | 16 | 25 |

#2 Table of Values

| x | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| y | 5 | 7 | 9 | 11 | 13 | 15 |

Demonstrate your understanding of proportional and non-proportional linear relationships by completing the chart below:

| Task | Proportional Relationships | Non-Proportional Relationships |
|---|---|---|
| • Write the table of values number (#1 and #2) under the column that represents the relationship between x and y.<br>• Explain how you know. | | |
| • Find the equation for each table and place it under the correct column.<br>• How did you know where to place each equation? | | |
| • Make a sketch of what the equations would each look like if you graphed them in the first quadrant. | | |
| • Under the appropriate column, write three ways you can tell if the relationship between the variables x and y is proportional or non-proportional. | | |

**CREATING A TABLE TASK**

1. Create a table of x and y values that represents a proportional relationship.

a) Explain how you know the relationship is proportional.

b) What equation models the values in the table?

2. Create a table of x and y values that represents a linear, non-proportional relationship.

b) Explain how you know the relationship is non-proportional.

c) What equation models the values in the table?

**QUICK WRITE**

1.  How can I determine if the linear relationship between the variables x and y is proportional?

_____

_____

_____

_____

_____

2.  How can I determine if the linear relationship between the variables x and y is directly proportional?

_____

_____

_____

_____

_____

_____