

Fall 2009

**PRE TEST KEY**

**Drying Salmon: Proportions Ratios and Pre Algebraic thinking**  
A 6<sup>th</sup> grade module  
in

**Math in a Cultural Context\***

**UNIVERSITY OF ALASKA FAIRBANKS**

<b><u>Student Name:</u></b>	<b>PRE TEST KEY</b>
<b><u>Grade:</u></b>	
<b><u>Teacher:</u></b>	
<b><u>School:</u></b>	
<b><u>Location of School:</u></b>	
<b><u>Date:</u></b>	

\*This project has been funded by the U.S. Department of Education, *Determining the Potential Efficacy of 6th grade Math in a Cultural Context Project*, Jerry Lipka, P.I.

**Note: Students may use a calculator for this test**

Total Score:

1. It takes 8 minutes for George to run one mile. If he runs at the same pace, how long will it take him to run 15 miles?

Show your work, and label with the units in minutes and miles.

**1 point**

$$8 \text{ minutes} \times 15 \text{ miles} = 120 \text{ minutes}$$

**OR**

$$\frac{1 \text{ mile}}{8 \text{ min}} = \frac{15 \text{ miles}}{x \text{ min}}$$

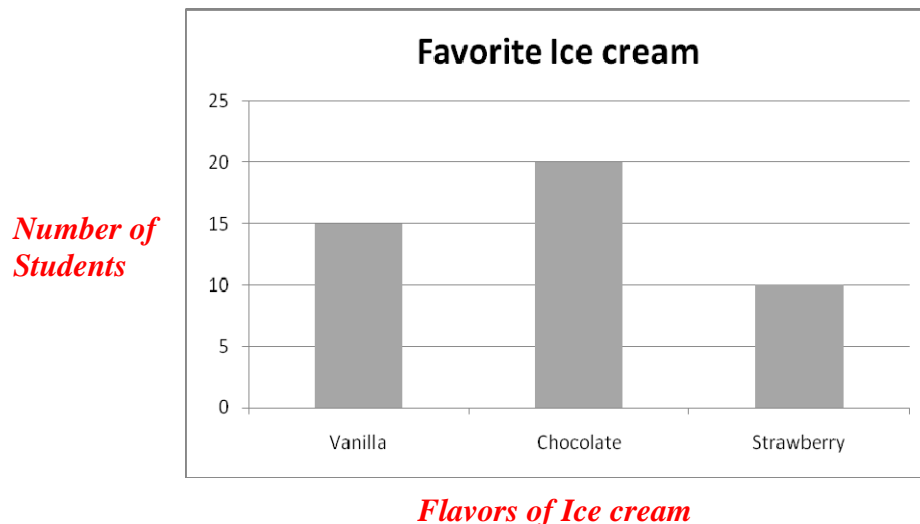
$$x = 120 \text{ minutes}$$

2. Mary asked 45 students to name their favorite ice cream flavors. She showed their favorites in the table below.

Make a bar graph to represent the data. Include a title and label the axes and the bars.

Ice cream Flavor	Number of Students
Vanilla	15
Chocolate	20
Strawberry	10

**3 points : title, labels, bars**



3. Use this math expression to answer the following questions:

$$2n + 1$$

- a. Circle the number pattern below that matches the expression, where  $n = 1$  for the first number in the pattern,  $n = 2$  for second number in the pattern, and so on.

**1 point**

i. 2, 3, 4

ii. 2, 4, 6

**iii. 3, 5, 7**

iv. 3, 4, 5

- b. Find the 15<sup>th</sup> number in the pattern and explain how you found it.

**1 point**

***31, Found by using the above formula***

4. You are planning lunch with friends. You will need to buy the soda, chips and sandwiches:

$b$  - the number of bottles of soda costing \$2 each,

$c$  - the number of bags of chips costing \$1 each, and

$e$  - the number of large sandwiches costing \$5 each

- a. Write a math expression (sentence) for how much the food will cost, using  $b$ ,  $c$  and  $e$  to represent each item.

**1 point**

$$2*b + 1*c + 5*e$$

- b. You have \$20. You want to buy 2 sandwiches, and 3 bottles of soda. How many bags of chips can you buy?

Write the equation.

**1 point**

$$20 = 2b + 1c + 5e$$

Solve your equation to show how many bags of chips can be bought along with the 2 sandwiches and 3 bottles of soda.

**1 point**

$$20 = 2(3) + 1c + 5(2)$$

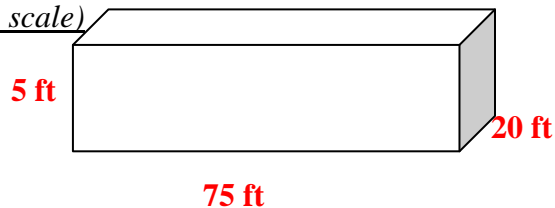
$$20 = 6 + 1c + 10.....$$

***4 bags of chips***

5. Your school principal wants to build a swimming pool in the school. The pool will be 75 feet long, 20 feet wide and 5 feet deep. The 6<sup>th</sup> grade class will put tiles on the pool sides and bottom. Each tile is 1 foot by 1 foot.

- a. Draw a sketch of the pool. Label your drawing with the pool's dimensions.

**1 point** (not drawn to scale)



- b. How many 1 ft. x 1 ft. tiles will cover the bottom of the pool?

**1 point**

$$75 * 20 = 1500 \text{ sq ft}$$
$$1500 \text{ tiles}$$

- c. How many tiles will cover all four sides of the pool?

**2 points** (one for the area of the two different sides, and one for the answer)

$$2 * (5 * 75) + 2 * (5 * 20)$$
$$2 * 375 + 2 * 100$$
$$750 + 200$$
$$950 \text{ tiles}$$

- d. What is the total number of tiles needed to cover the pool?

**1 point**

$$1500 + 950 = 2450 \text{ tiles}$$

- e. How much water, in cubic feet, will fit inside the pool?

**1 point**

$$5 * 20 * 75 = \text{volume}$$
$$7500 \text{ cubic feet}$$

6. Bill's height is half of his Dad's. Bill's height is twice the size of his little sister, Sara.
- a. Divide the blocks below to show the proportions of Dad's, Bill's and Sara's heights.



**1 point** Note: If student only has one set of lines for Sara's, and it is the correct placement (the first line, denoting half of Bill's length) that is an acceptable answer.

- b. What is the ratio of Sara's height to Dad's?

**1 point** *1 to 4*

- c. Complete the ratio that describes the relationship between Bill and Dad's height.

B:D:: 1 : 2

**1 point**

- d. If Dad's height is 72 inches, what is Sara's height?

**1 point** (*units are not required to receive the point*)

$$72 / 4 = 18 \text{ inches}$$

7. A baker made the chart below to help him plan his baking. He wanted to show how many brownies he could make from the bowls of batter.

Numbers of Bowls	Number of Brownies
3	36
6	72
9	108
12	144

- a. Circle the number that tells the relationship between the number of bowls and the number of brownies made?

**1 point**

i. The number of brownies equals the number of bowls divided by 12.

***ii. The number of brownies equals the number of bowls multiplied by 12.***

iii. The number of brownies equals 33 more than the number of bowls.

iv. The number of brownies equals 10 times the number of bowls plus 6.

- b. Finish the table with an expression using  $n$ , which stands for the number of bowls of batter. Write an expression to find the number of brownies.

**1 point**

Numbers of Bowls	Number of Brownies
3	36
6	72
9	108
12	144
$n$	$12*n$

8. Given the sequence: **1, 5, 9, 13**, \_\_\_ \_\_\_ \_\_\_

a. What are the next 3 numbers in the pattern?

**1 point**

*17, 21, 25*

b. What did you do to find the next numbers?

**1 point**

*Add 4 each time*

c. If  $n$  represents the place in the sequence (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> etc.), which expression allows you to get the  $n^{\text{th}}$  term in this sequence:

Circle the answer.

**1 point**

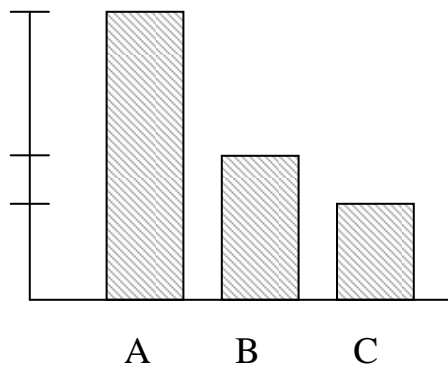
*i.  $4n - 3$*

ii.  $4n$

iii.  $n + 4$

iv.  $2n + 1$

9. The graph shows how 3 measures relate to each other. The bars are drawn in proportion to one another and the heights are marked on the Y axis.



Fill in the blanks below. Show all work.

**1 point**

a.  $1 \text{ A} = \underline{2} \text{ B}$

**1 point**

b.  $1 \text{ A} = \underline{3} \text{ C}$

**1 point**

c.  $3 \text{ C} + 2 \text{ B} = \underline{2} \text{ A}$

**1 point**

- d. Provide a different answer than the one you gave in part c.

$$3\text{C} + 2\text{B} = \underline{\text{possible answers include:}}$$

*6C*  
*1A + 2B*  
*1A + 3C*  
*4B*

10. A basketball player made 2 out of every 3 free throws. If she practiced 72 shots, about how many free throws will she make?

**1 point**

Circle the answer.

a. 24

b. 36

**c. 48**

d. 60

11. At a basketball game, only 8 people can sit in chairs on the floor in front of the bleachers. Each bleacher can hold 14 people.

- a. How many total people can sit on the chairs and the first 12 rows of bleachers? Show how you got your answer.

$$(12 * 14) + 8 = 176$$

*OR*

**1 point**

$$12 * 14 = 168$$

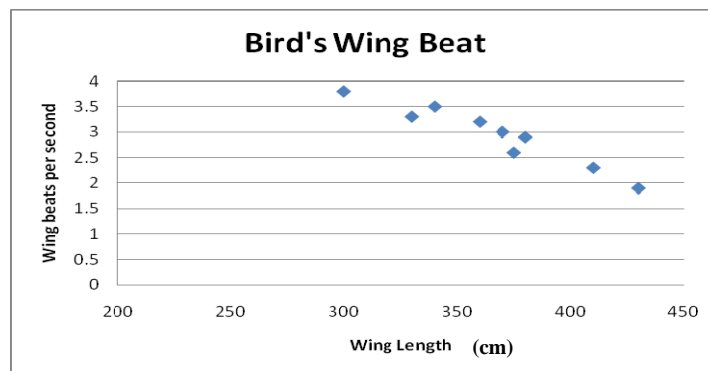
$$168 + 8 = 176$$

- b. Write an expression to find the total number of people that are sitting at a game. Since the number of bleachers used may vary, use **n** as the number of bleachers filled during a game.

**1 point**

$$14n + 8$$

12. Below is a scatter plot of the length of a bird's wing, and how fast it beats its wing.



Which of the following statements is correct based on the plot?

Circle the answer.

**1 point**

- a. The shorter the wing, the fewer beats per second.
- b. The longer a wing, the more beats per second.
- c. The longer the wing, the fewer beats per second.***
- d. There is no relationship between the length of a wing and the number of beats per second.

13. Mike is driving 440 miles at 55 miles per hour to attend college. After two hours he traveled 110 miles, after four hours he had gone 220 miles, and he made it to the college (440 miles) in eight hours.

a. Fill in the table below with the appropriate label and values from the problem.

**3 points (label, x values, y values)**

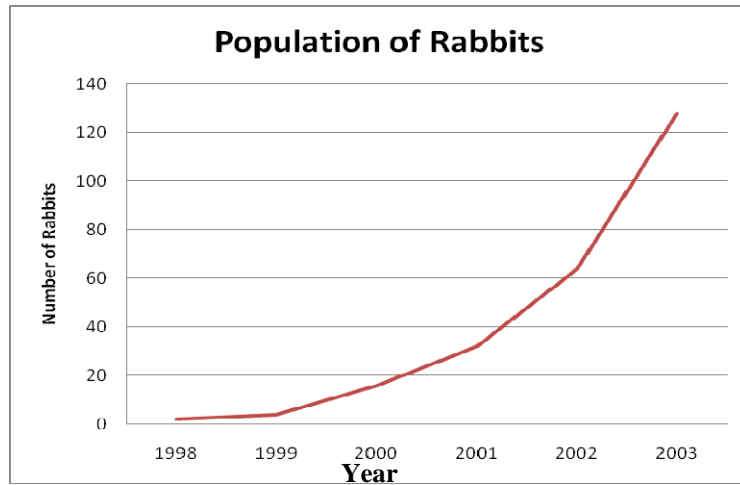
Mike's Trip to College	
Hours	<i>Miles</i>
2	<i>110</i>
<i>4</i>	<i>220</i>
6	<i>330</i>
<i>8</i>	<i>440</i>

b. How many miles did Mike drive in 6 hours?

**1 point**

*330 miles*

14. Below is a graph about the population of rabbits.



a. Between what two years did the rabbit population grow the **most**?

**1 point**

*2002 and 2003*

b. Between what two years did the rabbit population grow the **least**?

**1 point**

*1998 and 1999*

c. If the population of rabbits continues growing in this pattern, how many rabbits could there be in 2004?

**1 point**

Circle the answer.

i. 100

***ii. 250***

iii. 425

iv. 750