**Pre Test Key**

Designing and Testing Model Kayaks: Data Collection and Analysis

A 6th grade module

in

Math in a Cultural Context*

UNIVERSITY OF ALASKA FAIRBANKS

<table>
<thead>
<tr>
<th>Student Name:</th>
<th>Pre Test Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade:</td>
<td></td>
</tr>
<tr>
<td>Teacher:</td>
<td></td>
</tr>
<tr>
<td>School:</td>
<td></td>
</tr>
<tr>
<td>Location of School:</td>
<td></td>
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<tr>
<td>Date:</td>
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</tbody>
</table>

*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: 

Updated 1/05/10
1. Below is a line plot of the weight of students’ toy cars, in ounces.

![Weight of Student Cars](plot)

- **a.** What is the **mode** weight of the cars? ________ 5 ________ ounces
  (1 point)

- **b.** What is the **range** of weights? ________ 6 ________ ounces
  (1 point)

- **c.** What is the **mean weight**? ________ 6 ________ ounces
  (1 point)

- **d.** What is the **median weight**? ________ 5.5 ________ ounces
  (1 point)
2. Look at the fishing sinkers shown below. Each side weighs the same. Use the picture to answer the following questions.

   ![Diagram of a balance scale with weights on each side]

   a. If the two unmarked weights on the right are the same, how much does one of them weigh?

      **1 point**

      **9 grams**

   b. Explain how you found your answer:

      **1 point**

      Add the weights on the left to get 18 and divide by the number of weights on the right (2) to get 18 grams/2=9 grams

Updated 1/05/10
3. Sixth graders recorded the times that their toy cars took going down a 1 meter long ramp. The table below shows their results.

<table>
<thead>
<tr>
<th>Car</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Mean Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kathy’s car</td>
<td>3.8 sec</td>
<td>3.9 sec</td>
<td>4.0 sec</td>
<td>3.9 sec</td>
</tr>
<tr>
<td>Sue’s car</td>
<td>5.1 sec</td>
<td>5.5 sec</td>
<td>4.5 sec</td>
<td>5.0 sec</td>
</tr>
<tr>
<td>Bill’s car</td>
<td>4.5 sec</td>
<td>4.2 sec</td>
<td>4.1 sec</td>
<td>4.3 sec</td>
</tr>
</tbody>
</table>

a) What is the range of the data?

1 point

5.5 seconds – 3.8 seconds = 1.7 seconds

b) Find the mean times for the 3 students and enter them into the table. Round the answers to one decimal place. Be sure to include units.

3 points (1 for each answer)

c) Draw a bar graph showing the students’ mean times below. Include a title and labels.

Times for our cars

2 points
1 for correct data + 1 for correct labeling

d) Whose car was the fastest?

1 point

Kathy’s
4. Looking at the data sets below, circle which central tendency (mean, median or mode) best represents the data and find that value.

8 points  (1 point for each correct circle and one for each correct answer in each section)

a) 1, 53, 62, 49, 57  
   mean  median  mode

What is its value(s)?  _______ 53

b) 23, 24, 27, 30  
   mean  median  mode

What is its value(s)?  _______ 26

c) 23, 34, 27, 100, 31  
   mean  median  mode

What is its value(s)?  _______ 31

d) 1, 2, 2, 7, 11, 11, 11  
   mean  median  mode

What is its value(s)?  _______ 2 and 11
5. Nora’s family travels by many different methods. Below is a scatter plot showing some distances and times from trips they’ve taken.

![Distances and times for our travels]

**a. Use the plot to finish filling in the table.**

2 points (1 for the correct distances, 1 for the correct times)

<table>
<thead>
<tr>
<th>Travel Method</th>
<th>Distance (miles)</th>
<th>Time (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boat</td>
<td>150</td>
<td>6</td>
</tr>
<tr>
<td>Snow machine</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>Airplane</td>
<td>250</td>
<td>2</td>
</tr>
<tr>
<td>Dogsled</td>
<td>75</td>
<td>10</td>
</tr>
</tbody>
</table>

**b. Circle the explanation below that gives the best reason why the dog sled is the slowest method of travel.**

1 point

1. *Because it goes a short distance over a long time.*

ii. Because it goes a short distance in a short time.

iii. Because it goes a long distance in a short time.

iv. Because it goes a long distance over a long time.

**c. Nora’s Family took a trip in a car that took 2 hours and drove 125 miles.**

1 point Place an X on the scatter plot to represent on this trip.
6. Measure the angles.
   
   d. How many degrees is the angle below? \(125 \pm 2\) degrees
   
   \[1\text{ point}\]

   e. How many degrees is the angle below? \(80 \pm 2\) degrees
   
   \[1\text{ point}\]
7. Mrs. Smith is going shopping to buy school clothes for her three children, Sue, Bob and Tom. She gets confused because they each wear a different size and have a different favorite color. Sue wears size M and likes red, Bob wears size L and likes blue, and Tom wears size XL and likes green. Make a table of the data so that Mrs. Smith can buy her children the sizes that fit and colors they like.

2 points (1 point for drawing a table and 1 point for getting the data in correctly)

(Any table that correctly displays the data is acceptable. Here is a sample.)

<table>
<thead>
<tr>
<th>Kid</th>
<th>Size</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sue</td>
<td>M</td>
<td>Red</td>
</tr>
<tr>
<td>Bob</td>
<td>L</td>
<td>Blue</td>
</tr>
<tr>
<td>Tom</td>
<td>XL</td>
<td>green</td>
</tr>
</tbody>
</table>

8. June works at the produce department in a grocery store weighing fruit for customers. She notices the following:

2 points  (One point if they have done the substitution, but got the wrong answer)

3 bananas weigh the same as one apple and 4 small oranges

and

1 banana and 2 small oranges weigh the same as an apple

So, how many small oranges weigh the same as a banana? _______ 3 ____________

Updated 1/05/10
9. A basketball team has $150.00 to buy basketballs. If one basketball costs $25.60, what is the greatest number of basketballs the team can buy?

1 point

f. 4

\[ \boxed{g. 5} \]

h. 6

i. 7

10. A snail is trying to get to the other side of a road. Here is a graph showing how far he traveled in minutes.

1 point

Distance a Snail Traveled

At what rate is the snail traveling?

a. \( \frac{1}{2} \) foot per minute

b. 1 foot per minute

c. \( 1 \frac{1}{2} \) feet per minute

d. 2 feet per minute
11. A school snack bar sells 5 items as shown below.

<table>
<thead>
<tr>
<th>Snack Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chips               $1.25</td>
</tr>
<tr>
<td>Juice               $2.00</td>
</tr>
<tr>
<td>Orange              $0.75</td>
</tr>
<tr>
<td>Candy               $0.50</td>
</tr>
<tr>
<td>Gum                 $0.50</td>
</tr>
</tbody>
</table>

1 Point

a. What is the mean cost? __$1.00________

1 Point

b. Which pair of items could be added to the menu without changing the mean cost?

i. Banana ($0.75) and hot chocolate ($1.00)

ii. **Banana ($0.75) and peanuts ($1.25)**

iii. Energy Bar ($1.50) and peanuts ($1.25)

iv. Energy Bar ($1.50) and hot chocolate ($1.00)
12. Below is a model car whose length is being measured in inches. The ratio of inches to centimeters is 1 to 2.54.

1 point

a. How many inches long is the model car? _______4__________ inches

1 point

b. How many centimeters long is the car? _______10.16__________ cm

Car is 4 inches long. 4*2.54 = 10.16