

PRE TEST KEY

Building a Fish Rack: Investigation into Proof, Properties, Perimeter and Area

Math in a Cultural Context*

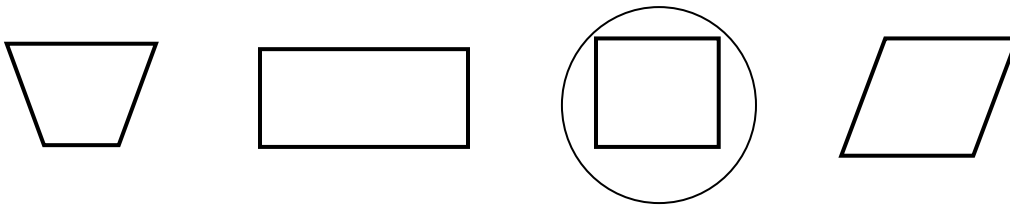
UNIVERSITY OF ALASKA FAIRBANKS

Student Name: PRE TEST KEY
Grade:
Teacher:
School:
Location of School:
Date:

*This project has been funded by the U.S. Department of Education, *Returning the Gift: Systemic Implementation of an Effective Culturally Based Math Curriculum and Professional Development Program*, Jerry Lipka, P.I.

Total Score:

1. Circle the square.



Circle the third shape.

0 points – wrong or 5 points – right

2. Circle the one true statement about the properties of a rectangle.

c. Opposite sides are parallel

0 points – wrong or 5 points – right

3. Rectangle says to Parallelogram, “I am parallelogram too!” How can this be true? Please explain your answer in detail. You may draw pictures to help explain.

A rectangle is a quadrilateral with opposite sides that are equal and parallel, which is the definition of a parallelogram. 5 points

They each have 4 sides = 1 point

They each have 4 angles = 1 point

They are each closed figures = 1 point

Drawings can be given points if they show the above and are labeled. Points would be distributed as indicated above.

[the student may receive 1, 2, 3, or 5 points]

4. You want to measure how much space something covers. What would you be measuring?

a. area

0 points – wrong or 5 points – right

5. a. Draw a rectangle that has a perimeter of 16 feet. Label the length and width with numbers.

Draw a rectangle with dimensions 1 and 7 and note that other correct solutions are possible.

Length	Width x 2	perimeter
7	1	16
6	2	16
5	3	16
4	4	16

0 points for no rectangle/square

1 point for a drawn rectangle but with no other work

2 points for rectangle and 1 side labeled

3 points for a rectangle and 2 sides labeled but perimeter does not equal 16

5 points for rectangle with sides labeled and perimeter equal to 16

- 5.b. Now draw a different rectangle with a perimeter of 16 feet. Label the length and width with numbers.

Draw a rectangle with dimensions 3 and 5 and note that other correct solutions are possible. The table above shows possible solutions

0 points for no rectangle/square

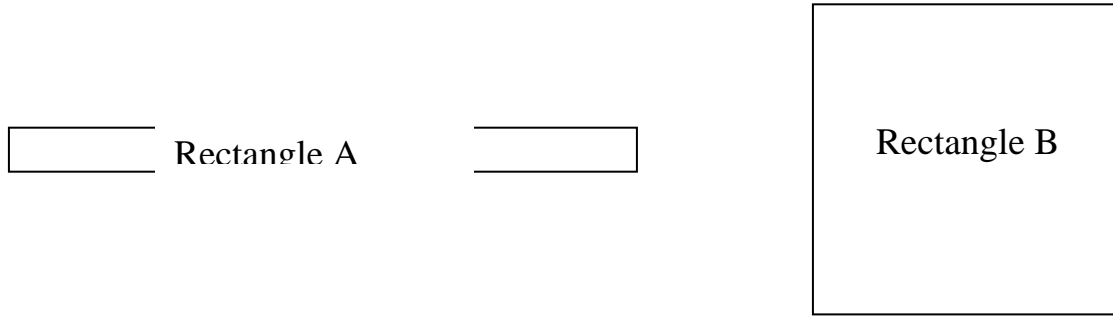
1 point for a different drawn rectangle but with no other work

2 points for rectangle and 1 side labeled

3 points for a rectangle and 2 sides labeled but perimeter does not equal 16

5 points for rectangle with sides labeled adding up to 16 and side and the bigger number is with the longer side

6. Rectangles A and B both have a perimeter of 20 cm.

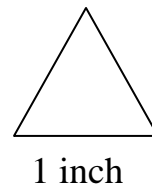
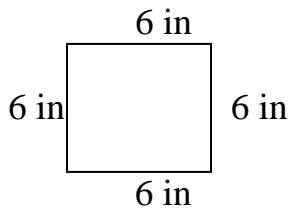


- a. Are the areas of these two rectangles the same or different? **Different**
0 points – wrong or 3 points – right
- b. How would you explain your answer to your math class?

Rectangles A and B cover different amounts of space –e.g., A could be 1 x 9 with an area of 9; B could be 5 x 5 with an area of 25 (both would have perimeter of 20 but different areas 2-points for this explanation

To receive points the student must show that both rectangles have a perimeter of 20—and show that they have different areas. No deduction for not showing square cm.

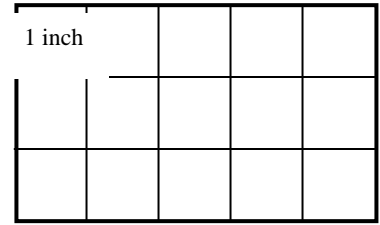
7. The perimeter of a square is 24 inches. The equilateral triangle (a triangle with 3 equal sides) below has the same perimeter as the square. What is the length of one side of this equilateral triangle? Circle the correct answer.



c. 8 inches

0 points – wrong or 5 points – right

- 8.a. What is the total distance around the outside of the large rectangle to the right? Be sure to include the correct units.



16 inches or 16 in.

0 points – wrong or 5 points – right

- 8.b. What is the total space inside the large rectangle to the right? Be sure to include the correct units.

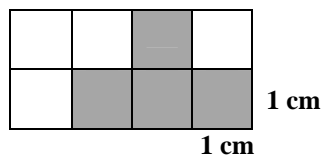
15 square inches or 15 sq. in.

0 points – wrong or 5 points – right

9. What is the perimeter of the shaded region shown below? 10 cm.
no deduction if the student shows only "10"

Each side of a square is 1 cm.

0 points – wrong or 5 points – right



- 10.a. Draw a rectangle that has an area of 36 square inches. Label the length and width with numbers.

Students draw a rectangle that has dimensions 4 and 9.

Other answers are possible, e.g. 2 x 18, 3 x 12 etc.

0 points for no rectangle/square

1 point for a rectangle with no other work

3 points for rectangle and sides labeled with the lengths multiplying to 36

5 points for rectangle with sides labeled, multiplying sides equals 36 and the longer side and the larger value are aligned.

- 10.b. Now draw a different rectangle with an area of 36 square inches. Label the length and width with numbers.

Students draw a rectangle that has dimensions 6 and 6 (i.e., a square with edge length of 6).

0 points for no rectangle/square

1 point for a rectangle with no other work

3 points for rectangle and sides labeled with the lengths multiplying to 36

5 points for rectangle with sides labeled, multiplying sides equals 36 and the longer side and the larger value are aligned.

11. Make up a story problem in which you need to find the area of a space.

Many responses are possible, e.g., “I need to tile a (rectangular) room that is 10 feet long and 8 feet wide – how many 1 foot square tiles do I need to tile the room?”

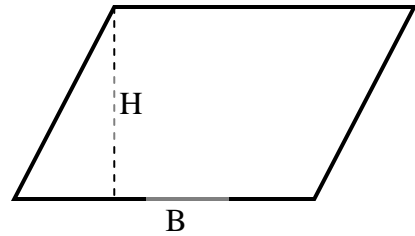
0 points for no work

1 points for word problem showing perimeter

5 points for word problem that shows area

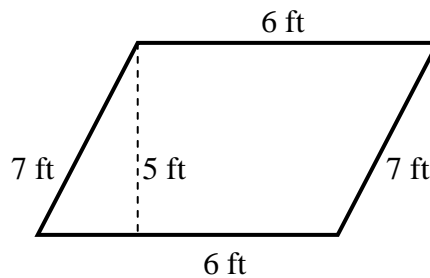
12. Circle the correct formula for the area of a parallelogram.

c. $A = B \times H$



0 points for the wrong answer and 5 points for the right answer

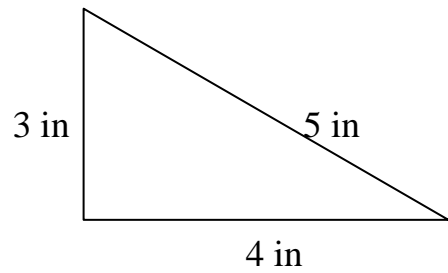
13. Find the area and perimeter of the figure shown below:



a. Perimeter = 26 ft. 0 to 5 points

b. Area = 30 sq. ft. 0 to 5 points

14. Find the area of the following triangle.



Area = **6 sq. in.**

0 points for the wrong answer and 5 points for the correct answer