The Forgotten 4th C

Creativity in the Math Class

Chris Shore
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shore@mathprojects.com
mathprojects.com/presentations

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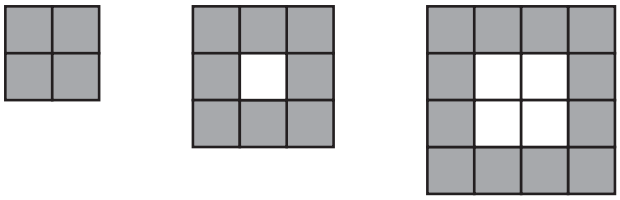
#CreativityInMath

Rule Quest | edge squares

Mathematics is often referred to as the "science of patterning." The job of any good mathematician is to discover the patterns of the universe and communicate them in an easy, efficient manner. The following activity gives you the opportunity to find some of these patterns and write the algebraic rules that describe them.

1. How many edge squares are there around the arrangements below?

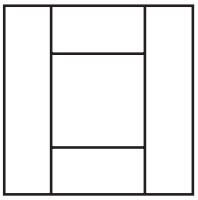
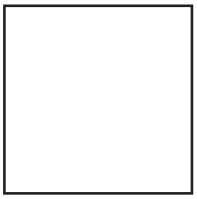
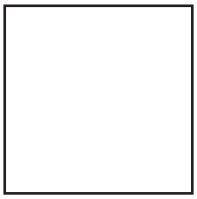
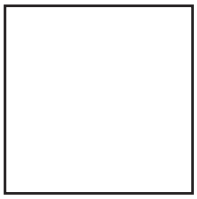


2. Complete this table. Use it to summarize and extend your results from question 1.

Length of side of square	2	3	4	5	6	10	100
Number of edge tiles							

3. Write how you found the answer to the side of length 10.

4. The diagram below illustrates how you could show and calculate the number of edge tiles. Show another way in which the edge tiles could be illustrated

a)  b)  c)  d) 

5. Write down in words the instructions for the four diagrams above. The first is given as an example.

	Verbal Description (#5)	Equation (#6)
a)	Add the length of the side to itself, and then add two less than the length, and then add two less than the length again.	n = s + s + (s - 2) + (s - 2)
b)		
c)		
d)		

6. Rewrite each of the instructions above using *n* and *s* to represent the total number of edge tiles and the number of tiles along one edge of the square.

7. What is the simplified formula for each answer in #6? How does this formula relate to the table in #2?

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The Student Generated Word Problem: Write a word problem that can be solved by using an equation, write and solve the equation relating the solution to the original word problem.

_____

_____

_____

_____ _____

The 4-Digit Problem: Arrange four 8's to equal a given value. You are permitted to use any of the four operations (addition, subtraction, multiplication and division) as well as parentheses and exponents. You may also use any number you wish for an exponent or root, but other than that, only 8's are allowed. For instance, 8^2 is permissible, but 2 • 8 is not. The number 88 may count as two 8's, but the number 18 is not permissible. You must use exactly four 8's for each solution. For examples,

$8 + 8 + 8 + 8 = 32$ $\frac{8^2}{8} + 88 = 96$

Arrange four 8's to equal 19.

Number Trick #1

Pick a Number _____ _____ _____ _____

Multiply by 2 _____ _____ _____ _____

Add 3 _____ _____ _____ _____

Subtract twice the Original Number _____ _____ _____ _____

Common Result: _____ Simplified Result: _____

Number Trick #2

Pick a Number _____ _____ _____ _____

Add 3 _____ _____ _____ _____

Multiply by 2 _____ _____ _____ _____

Subtract 6 _____ _____ _____ _____

Subtract the Original Number _____ _____ _____ _____

Common Result: _____ Simplified Result: _____

Number Trick Yours

Pick a Number _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

Common Result: _____ Simplified Result: _____

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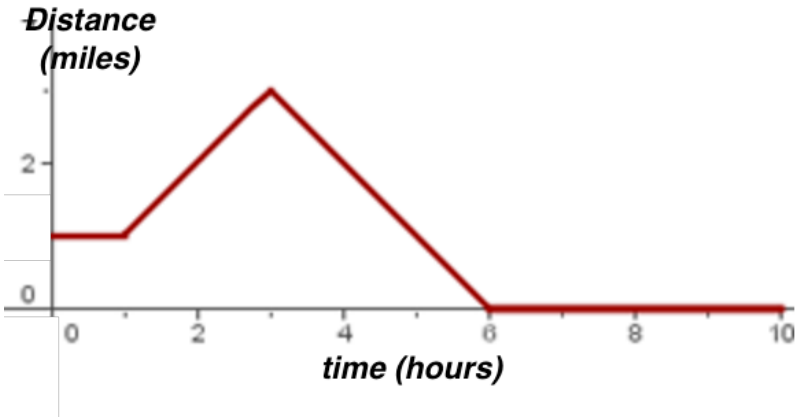
1. Fill in the blanks for each expression so that c has a negative value.

   -7(____) = c - 5 + ____ = c

2. Create a data set of 5 numbers for which …

   a) the median equals the mean. b) the median is greater than the mean.

3. Write a scenario that may be represented by the graph below. Include significant values and rates.



4. Write a quadratic function, f(x), for which f(-3) = 20. Verify your response.

5. Write an equation in any form (slope-intercept, point-slope, standard). Then write a point that is a solution and another one that is not a solution. Verify each.

6. Graph any parabola that shows ….

   a) one real root b) two real roots c) two complex roots

7. Accurately draw two triangles that are **not** similar. Show all six measurements for each triangle, and explain/show why they are not similar.

8. Draw an example of the
   a) AA~ Postulate. b) SAS~ Postulate

9. Sketch an example of both a 45-45 and a 30-60 right triangle that demonstrates the ratio of the sides of special right triangles.

10. Write the equation of a circle that has center that is not the origin. Graph your equation.

11. Draw a composite solid that has a volume between 100 cm^3 and 200 cm^3.

12. Write the equation of a rational function for which the graph has a hole, a vertical asymptote and a horizontal asymptote, and identify each.

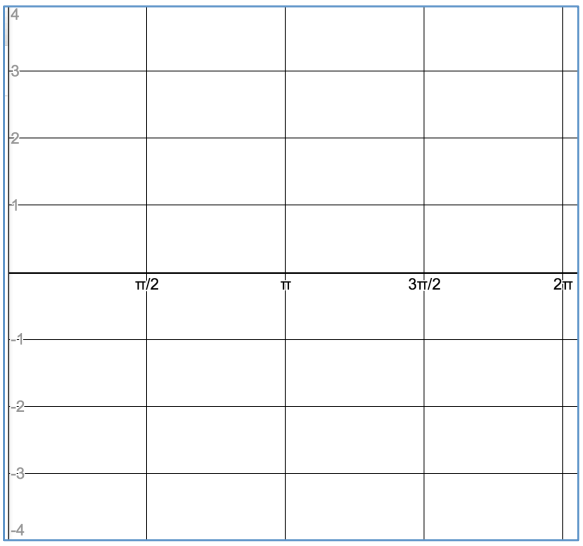
13. Graph an exponential equation that has a range of (2, ∞). Write the equation for your graph and offer three points.

14. Write an expression of the form $\log_a b$ that has a value of 3.

15. Write the equation of a logarithmic function that has an asymptote of x = 3 and an x-intercept of (0, 4). Then graph your equation.

16. Create a graph of a polynomial function that has a degree greater than three and at least one double root.

17. Create two different functions that pass through the point $\left(\frac{\pi}{2}, 0\right)$. Graph each equation.



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Crazy Cola's Double Case: Crazy Cola company wants to market a 'double case' of 48 cans. As a marketing team member, offer a way to stack the 48 cans within the rectangular box. Draw a picture of it showing the three dimensions in inches. A standard soda can is 4.75" tall and 2.5" in diameter.

Calculate the double cases surface area and volume in square inches and cubic inches, respectively.