

How Rich are These Problems?

1. Each student gets an algebraic equation in one variable. They must find everyone else in the class whose equation has the same solution.
2. Take any three consecutive integers. Square the middle number and multiply the first and the third numbers. Compare your answers. Use algebra to find out why this will always happen.

3. Rationalize the denominator of $\frac{b + \sqrt{b}}{b + 1 + \sqrt{b}}$.

4. Within Eldoria, a little country far away, you can place a call with one of two companies.
EZ phone charges \$24/month for the first 3 hours and then 8¢/minute. U-Call phone charges \$30/month for the first 2 hours and then 5¢/minute.
 - a. After how many minutes of local calls will the two plans use exactly cost exactly the same?
 - b. Make a graph of each cell plan on the same set of axes. Make sure to label your axes.

5. There are many rules that fit the information in the In | Out table below:

In	Out
5	16

- a. Your task is to find at least 10 different rules that work. You can use multiplication, division, addition, subtraction and exponents and you can use more than one operation in a single rule.
- b. The table below has a bit more information than the one above, but that only makes things harder. Find as many rules as you can that fit both rows of this table.

In	Out
1	2
2	5

6.
 - a. On the same set of axes, plot the graphs of $\frac{1}{2}x^2$, x^2 , $2x^2$ (Be sure to use both positive and negative values for x !)
 - b. On a second set of axes, plot the graphs of $-\frac{2}{3}x^2$, $-2x^2$ and $-x^2$.
 - c. Write a paragraph explaining the 'a' in ax^2 affects the graph of x^2 .