Decompose and determine the value.

1. 12^3
2. 6^5
3. 0.27^2
4. 2.11^1
5. $\left(\frac{2}{3}\right)^4$
6. $\left(\frac{1}{12}\right)^3$

Recompose.

7. $\frac{1}{n}\times\frac{1}{n}\times\frac{1}{n}\times\frac{1}{n}\times\frac{1}{n}$
8. $2\frac{11}{17}\times 2\frac{11}{17}\times 2\frac{11}{17}\times 2\frac{11}{17}\times 2\frac{11}{17}\times 2\frac{11}{17}\times 2\frac{11}{17}$
9. $(p+31)\times(p+31)\times(p+31)$

Rewrite the product as a base and exponent using the given information.

10. 256, base 4
11. 16,807, base 7
12. 6561, base 3

BEFORE YOU TURN YOUR PAPER OVER DO THIS FIRST!!!!!

Think about it…… You know how to work with whole number positive exponents to determine a solution. How would a negative whole number exponent, change the solution? Use the following example to **<u>make a prediction</u>**. If 3^2=9, what is the value of3^{-2}?

Exponent Form	Product
10^5	
10^4	
10^3	
10^2	
10^1	
10^0	
10^{-1}	
10^{-2}	
10^{-3}	
10^{-4}	
10^{-5}	
10^{-6}	
10^{-7}	
10^{-8}	

Determine the product of each number written in exponent form using a base of 10 from 10^5 to 10^1.

Look the products that were determined from the positive whole number exponents. How can a previous product be used to determine a product directly below it? (HINT: Start at the top of the list and work down!)

Could this same idea be applied to the products that will be determined that have an exponent of zero as well as negative exponents on the base?

Determine the product of the numbers that have an exponent of zero to -8.(NOTE: You may not use decimals.)

How does the product for an exponent that is negative differ from the product for an exponent that is positive?

Now try this…..

Exponent Form	Product
2^5	
2^4	
2^3	
2^2	
2^1	
2^0	
2^{-1}	
2^{-2}	
2^{-3}	
2^{-4}	
2^{-5}	
2^{-6}	
2^{-7}	
2^{-8}	

Review your solutions and explanations for the previous chart. Apply your new knowledge to fill in the chart for working with exponents with a base of 2.

Think about your answer on the front of the page for 3^{-2}. If your prediction was incorrect, write correct answer here.

Using the base 10 example and the base 2 examples, write a rule for solving an expression with a negative whole number exponent.

Challenge: Can you use your rule to determine a solution for the expression below?

n^{-3}