Purpose: In this problem set, you will be utilizing your skills with exponential and logarithmic functions to answer questions in scenarios determined at random! Beware that not all rolls of the dice will be reasonable.

1. You will need one double die and one linear term die (x, $2x$, etc.).

   (a) Roll the double die and record the sum of the two values: _____

   (b) Roll the linear die: _____

   (c) Build a function as follows: use the recorded number as the base and the linear term as the exponent. _____

   (d) Sketch the graph of your function. Label at least three points.

   (e) Give the domain, range, and horizontal asymptote of your function.

   (f) What is the inverse of this function? Write it below and add the graph to your sketch above including at least three points.

2. Let's do it again! You will need one double die and one linear term die (x, $2x$, etc.).

   (a) Roll the double die and record the sum of the two values: _____

   (b) Roll the linear die: _____

   (c) Build a function as follows: use the recorded number as the base and the linear term as the exponent. _____

   (d) Sketch the graph of your function. Label at least three points.

   (e) Give the domain, range, and horizontal asymptote of your function.

   (f) What is the inverse of this function? Write it below and add the graph to your sketch above including at least three points.

3. You will need one double die.

   (a) Roll one double die. Inside: _____ Outside: _____

   (b) Create an equation of the form $\log_{(\text{inside})}(x) = (\text{outside})$. Solve for x.

   (c) Sketch a graph of $y = \log_{(\text{inside})}(x)$ including at least three points.

4. Let's do it again. You will need one double die.

   (a) Roll one double die. Inside: _____ Outside: _____

   (b) Create an equation of the form $\log_{(\text{inside})}(x) = (\text{outside})$. Solve for x.

   (c) Sketch a graph of $y = \log_{(\text{inside})}(x)$ including at least three points.

5. You will need one triple die.

   (a) Roll the triple die.

   Blue: _____ Red: _____ White: _____

   (b) Construct a logarithmic expression as follows:

$$\ln\left(b^{(\text{blue})}r^{(\text{red})}w^{(\text{white})}\right)$$

   (c) Expand this expression as much as possible.

6. Let's do it again! You will need one triple die.

   (a) Roll the triple die.

   Blue: _____ Red: _____ White: _____

   (b) Construct a logarithmic expression as follows:

$$\ln\left(b^{(\text{blue})}r^{(\text{red})}w^{(\text{white})}\right)$$

   (c) Expand this expression as much as possible.

7. You will need one triple die and one double die

   (a) Roll the double die. Inside: _____ Outside: _____

   (b) Roll the triple die.

   Blue: _____ Red: _____ White: _____

   (c) Construct a logarithmic expression as follows:

$$\ln\left(\frac{x^{(\text{blue})}y^{(\text{red})}z^{(\text{white})}}{a^{(\text{inside})}b^{(\text{outside})}}\right)$$

   (d) Expand this expression as much as possible.

8. Let's do it again! You will need one triple die and one double die

   (a) Roll the double die. Inside: _____ Outside: _____

   (b) Roll the triple die.

   Blue: _____ Red: _____ White: _____

   (c) Construct a logarithmic expression as follows:

$$\ln\left(\frac{x^{(\text{blue})}y^{(\text{red})}z^{(\text{white})}}{a^{(\text{inside})}b^{(\text{outside})}}\right)$$

   (d) Expand this expression as much as possible.

9. You will need one triple die and one double die

   (a) Roll the double die. Inside: _____ Outside: _____

   (b) Roll the triple die.

   Blue: _____ Red: _____ White: _____

   (c) Construct a logarithmic expression as follows:

$$(\text{inside})\log(\text{red}) - (\text{outside})\log(\text{blue}) + \log(\text{white})$$

   (d) Condense this expression as much as possible.

10. Let's do it again! You will need one triple die and one double die

   (a) Roll the double die. Inside: _____ Outside: _____

   (b) Roll the triple die.

   Blue: _____ Red: _____ White: _____

   (c) Construct a logarithmic expression as follows:

$$(\text{inside})\log(\text{red}) - (\text{outside})\log(\text{blue}) + \log(\text{white})$$

   (d) Condense this expression as much as possible.

11. Make your own question and trade with a partner!