Progress Check Follow Up (B8): Exponentials/Half-Life **CP** Name:_____

Lindsay went to her doctor to get a new prescription for toenail fungus. Her doctor talked to her about the importance of taking her medicine regularly. When explaining this new medication to Lindsay, he used the following half-life function, where t represents time in hours:

$$M(t) = 60\left(\frac{1}{2}\right)^{\frac{t}{12}}$$

Explain what each part of the equation would represent.

Initial amount of medication = 60 units ; This would represent the beginning amount of medication that the doctor gives Lindsay. We know this because the value of 60 is in the spot where $\boldsymbol{a}$ would go in the standard half-life formula $y = a\left(\frac{1}{2}\right)^{\frac{t}{h}}$, and $\boldsymbol{a}$ is the y-intercept/starting value of the equation.

Length of half-life cycles = 12 hours ; This would represent the length of the half-life cycles because we know that time is $\boldsymbol{t}$ and we have to divide the exponent of time $\boldsymbol{t}$ by the length of the half-life cycles to end up with the number of half-life cycles.

Amount of medicine present after *t* hours = M(t) units ; This would represent the amount of medicine present after $\boldsymbol{t}$ hours. We know this because it is the ending amount of the equation using function notation(same as y= in the standard formula).

Additional Practice:

The half-life of a foul substance is 4 years. If you have 8oz. of this strange substance, how much will be left in 20 years?

$$\boldsymbol{y = a(b)^{\frac{t}{h}}}$$

Identify the values that each variable in the equation would represent <u>and</u> explain how you know.

1. **a =**
2. **b =**
3. **t =**
4. **h =**

When you solve for y, what are you finding?

Progress Check Follow Up (B8): Exponentials/Half-Life **HN** Name:_____

Lindsay went to her doctor to get a new prescription for toenail fungus. Her doctor talked to her about the importance of taking her medicine regularly. When explaining this new medication to Lindsay, he used the following half-life function, where t represents time in hours:

$$M(t) = 60\left(\frac{1}{2}\right)^{\frac{t}{12}}$$

Explain what each part of the equation would represent.

60 = initial amount of medicine ; We know this because the value of 60 is in the spot where $\boldsymbol{a}$ would go in the standard half-life formula $y = a\left(\frac{1}{2}\right)^{\frac{t}{h}}$, and $\boldsymbol{a}$ is the y-intercept/starting value of the equation.

1/2 = decay factor (half -life) ; This would represent the decay factor $\boldsymbol{b}$ in the standard exponential formula $y = a(b)^x$. Because the medication has a decay factor of ½ or 50%, we know that $\boldsymbol{b}$ has to be ½.

t = time in hours ; This would represent the time in hours because it is the variable in the exponent.

12 = length of the half-life cycle ; This would represent the length of the half-life cycles because we know that time is $\boldsymbol{t}$ and we have to divide the exponent of time $\boldsymbol{t}$ by the length of the half-life cycles to end up with the number of half-life cycles.

M(t) = amount of medicine present after t hours ; This would represent the amount of medication after t hours because it is the ending amount of the equation using function notation(same as y= in the standard formula).

Additional Practice:

The half-life of a foul substance is 4 years. If you have 8oz. of this strange substance, how much will be left in 20 years?

$$\boldsymbol{y = a(b)^{\frac{t}{h}}}$$

Identify the values that each variable in the equation would represent <u>and</u> explain how you know.

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When you solve for y, what are you finding?