KEY

Integrated Math 3 **Name** _____

12.1-12.3 Exponential Functions Quiz Review **Period** _____ **Date** _____

Construct an exponential function from each Geometric Sequence.

1. $a_n = 3 \cdot (4)^{n-1}$

$3 \cdot 4^n \cdot 4^{-1}$

$3 \cdot 4^n \cdot \frac{1}{4}$

$\frac{3}{4} \cdot 4^n$

2. $a_n = 2 \cdot (\frac{1}{3})^{n-1}$

$2 \cdot \frac{1}{3}^n \cdot \frac{1}{3}^{-1}$

$2 \cdot \frac{1}{3}^n \cdot 3$

1. $f(n) = \frac{3}{4} \cdot 4^n$

2. $f(n) = 6 \cdot \frac{1}{3}^n$

Half-Life

3. A new pop contains 60 mg of sugar. Once consumed, the sugar has a half-life of 3 hours in the body. If Mr. Mraz drinks the pop at 12:00 p.m., how much sugar would still be in his system when he leaves at 9:00 p.m.?

$60 \cdot (\frac{1}{2})^{\frac{9}{3}}$

$60 \cdot (\frac{1}{2})^3$ $60 \cdot \frac{1}{8}$

3. 7.5 mg

4. Blaskonian -195 is used for appendix scans and has a half-life of 4 days. If the amount of Blaskonian-195 needed for a study is 4.0 grams and the time allowed for shipment is 20 days, how much Blaskonian-195 will need to be ordered?

$4 = x \cdot (\frac{1}{2})^{\frac{20}{4}}$

$4 = x(\frac{1}{2})^5$

$32(4) = x(\frac{1}{32}) \cdot 32$

$128 = x$

4. 128 g

Many Possible Answers

5. Write an exponential function that would be *increasing* over the interval $(-\infty, \infty)$.

5. $b > 1$; $y(x) = 5^x$

6. Write an exponential function that would be *decreasing* over the interval $(-\infty, \infty)$.

6. $0 < b < 1$; $h(x) = \frac{1}{3}^x$

7. Write an exponential function that would show exponential *decay*.

7. $f(x) = 0.5^x$

Compound Interest

7. If you have a bank account whose principal = $2000, and your bank compounds the interest twice a year at an interest rate of 2.5%, how much money do you have in your account at the year's end? (Assume you do not make any deposits or withdrawals).

$2000 \cdot \left(1 + \frac{.025}{2}\right)^{2 \cdot 1}$

$2000 \cdot (1.0125)^2$

7. $2,050.31

8. If you start a bank account with $20,000 and your bank compounds the interest quarterly at an interest rate of 6%, how much money do you have after three years? (Assume you do not make any deposits or withdrawals).

$20000\left(1 + \frac{.06}{4}\right)^{4 \cdot 3}$

$20000\,(1.015)^{12}$

8. $23,912.36

Population Growth and Decay

9. In 2015, the population in Homer Glen was 30,200. It is projected that the population will grow continuously at a rate of 1.4% each year. What is the anticipated population for Homer Glen in the year 2030?

$30200\, e^{.014 \cdot 15}$

$30200\, e^{.21}$

9. $\approx 37,257$

10. Using your population model from the above example, what was the population of Homer Glen in 1990? (Assume the population grew at the same 1.4% rate from 2000 to 2015).

$30200\, e^{.014 \cdot -25}$

$30200\, e^{-.35}$

10. $\approx 21,282$

Transformations on Exponential Functions

11. Given: $f(x) = 4^x$ and $g(x) = -4^{x-1} + 2$

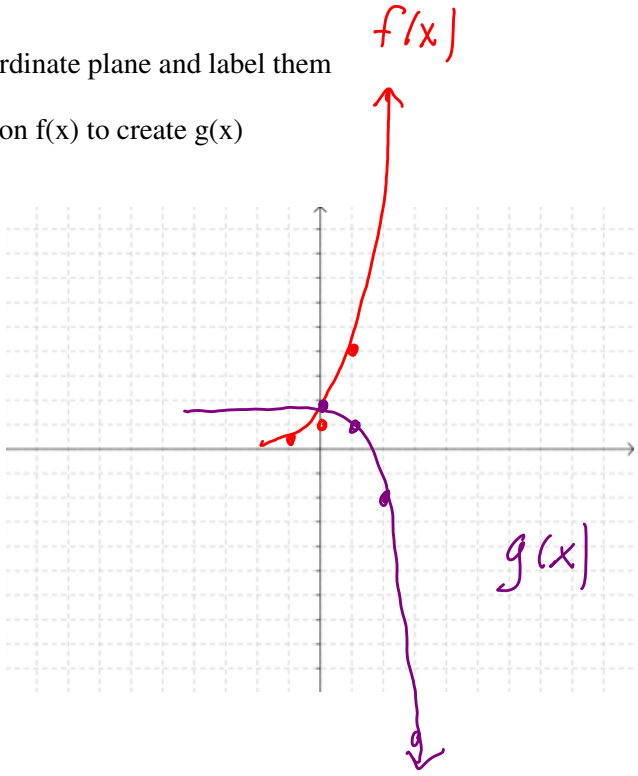
a) Complete the table of values provided

b) Graph BOTH functions on the same coordinate plane and label them

c) Describe the transformations performed on f(x) to create g(x)

x	f(x)
-1	$\frac{1}{4}$
0	1
1	4
2	16

x	g(x)
0	1.75
1	1
2	-2
3	-14



c) Transformations

1. Shifts 1 Unit Right
2. Shifts 2 Units Up
3. Reflection Over x-axis

12. What transformations are performed on $f(x) = e^x$ to generate $h(x) = e^{x-6} + 2$?

(1) Shifted 6 Units Right

(2) Shifted 2 Units Up