

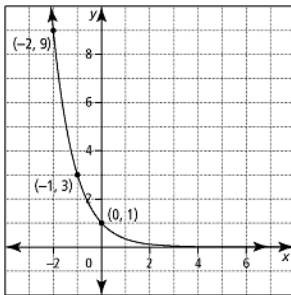
Quiz: Exponential Functions.

Name: _____

1. Match each function with the corresponding transformation of $y = 2^x$.

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|----|---------------|---|-----------------------------|
| a) | $y = -2^x$ | A | reflection in the x -axis |
| b) | $y = 2^{-x}$ | B | reflection in the y -axis |
| c) | $y = 2^x - 2$ | C | vertical stretch |
| d) | $y = 2^{x-2}$ | D | horizontal stretch |
| | | E | translation down |
| | | F | translation up |
| | | G | translation left |
| | | H | translation right |

2. What function in the form $y = c^x$ can be used to describe the graph shown?



3. A sample of water contains 300 g of pollutants. Each time the sample is passed through a filter, 30% of its pollutants are removed.

- Write a function that relates the amount of pollutant, P , that remains in the sample to the number of times, t , the sample is filtered.
- Determine an expression that gives the amount of pollutants still in the water after it passes through 4 filters. How many grams are there after 4 filters, rounded to the tenth of a gram?

4. Iodine-126 has a half-life of 13 days.

a) Write an exponential function that can be used to represent the radioactive decay of 100 g of Iodine-126.

b) How much Iodine-126 will be left after 40 days? Round your answer to hundredths of a gram.

d) Describe how you might use a graph to calculate the length of time it will take for 100 g of Iodine-126 to decay to 15 g. How long will this decay take, to the nearest half day?

5. For each function, state the parameters a, b, h, and k. Describe the transformation that results from each parameter.

$$f(x) = -(0.2)^{x-5}$$

$$g(x) = \frac{3}{2}(5)^{4(x-6)} + 4$$

6. Write the transformed function in the form $y = a(c)^{b(x-h)} + k$.

$$f(x) = \left(\frac{2}{5}\right)^x, \quad y = -\frac{1}{3}f[2(x-3)] - 5$$

7. Solve. Check your answer by substitution.

a. $3^{4x} (3) = 27^{2x}$

b. $\left(\frac{4}{7}\right)^{5x} = \left(\frac{64}{343}\right)^{2x-1}$

8. If \$5000 is invested at 7.2% per year compounded monthly, how long will it take for the investment to increase to \$8000? Give your answer in years to two decimal places.

9. Malcolm bought a new car for \$24 000. Every year it will depreciate in value by 8%.

a. How much will the car be worth after 5 years?

b. How long will it take for the car to be worth a quarter of its original value? Give your answer to two decimal places.