Trigonometry/Precalculus
Chapter 3 Review
Day_____ CW/HW

Name
Date
Block

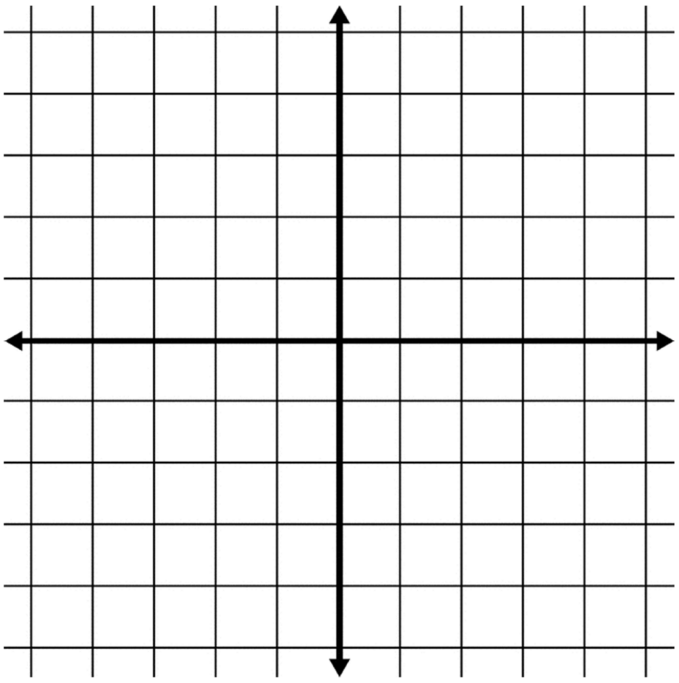
Fill in the following statements.

1) The inverse of an exponential function is a _____ function.

2) The inverse of $f(x) = 7^x$ is $g(x) =$ _____.

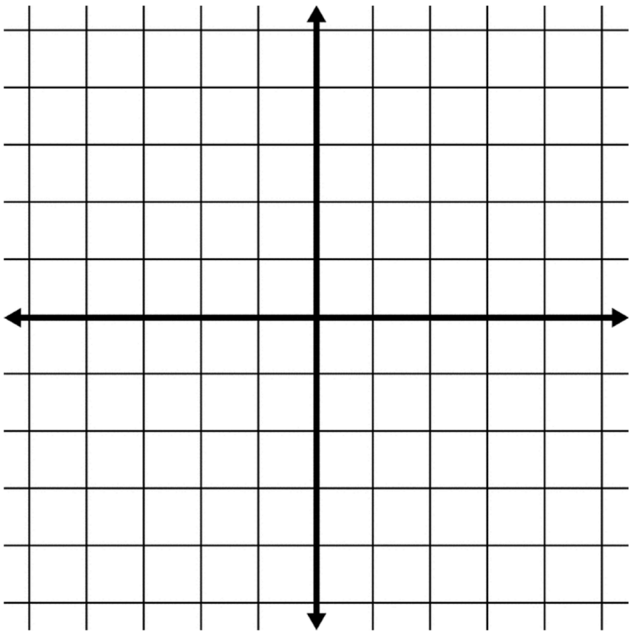
3) The inverse of $f(x) = log_6 x$ is $g(x) =$ _____.

4*) Use the idea of inverses to draw an accurate sketch of both $f(x) = 3^x$ and $g(x) = log_3 x$. Then state the domain, range and asymptote of each.



$f(x)$	$g(x)$
D:	D:
R:	R:
Asymptote:	Asymptote:

5 A*) Draw and accurate sketch of $f(x) = 2^x$.



B*) Describe how $g(x) = -2^{(x+3)} - 1$ compares to f(x).

C*) Use part b to draw g(x).

D*) Sketch and label $h(x) = 2^{-x} + 1$

6*) Arrange the following in order from smallest to largest. (try without a calculator)

$\log_2 5$ $\log_2 1$ $\log_2 3$

$\log_3 9$ $\log_3 8$ $\log_2 \frac{1}{2}$

$\log_3 \sqrt[3]{3}$ $\log_2 8$

a) _____ e)_____

b)_____ f)_____

c)_____ g)_____

d)_____ h)_____

7*) Find the exact value of each logarithmic expression without using a calculator.

a) $\log_4 64$ b) $\log_2 \sqrt[4]{8}$ c) $\log_4 16^{1.2}$ d) $\ln \frac{1}{\sqrt{e}}$

e) $\log_9 \frac{1}{3}$ f) $\log \frac{1}{1000}$ g) $\log_8 1$ h) $\ln e^3 - \ln e^7$

8) Write an equation in the form $y = ab^x$ that passes through the following points (1, 12) and (-1, 3) .

9) Use the properties of logs to expand the following expressions:

a) $\log xyz^2$ b) $\log \frac{6}{\sqrt{x+1}}$

10) If $\log_b M = 2.1$ and $\log_b N = -3$, use properties of logs to find $\log_b \frac{\sqrt{M}}{N^3}$.

11) Solve the following. Find exact values when possible.

a) $\log_5 x = 3$

b*) $9^{x+10} = 27^{2x+3}$

c) $7 + \log (x-4) = 9$

d) $243 = 3(10^x)$

e) $e^{x-3} + 8 = 10$

f) $\log_5 x - \log_5 7 = \log_5 12$

g) ½ log x + log 5 = log 30

h) $\log_2 x - \log_2 3 = 4$

i) $ln\frac{2}{x} = 1$

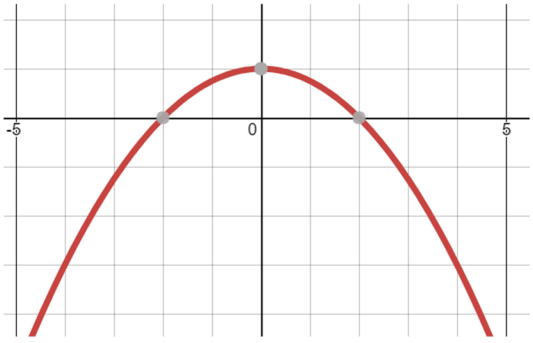
j) $log_3 (5x^2) = log_3 (3x + 2)$

k) $log_x 2{,}401 = 4$

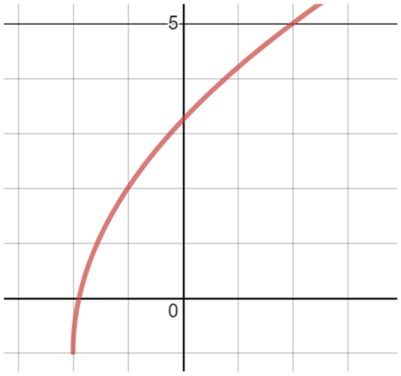
l*) $\left(\frac{1}{32}\right)^x = 16^{(x+1)}$

12*) Write the equation of each transformed parent function.

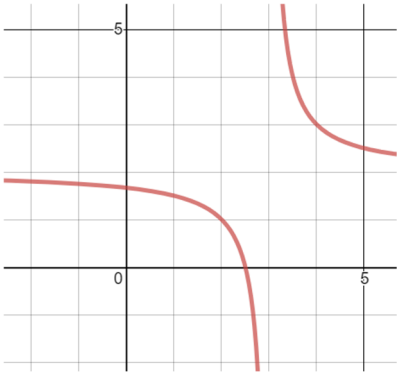
a)



b)



c)



13) In a research experiment, a population of fruit flies is increasing according to the law of exponential growth. After 2 days there are 100 flies, and after 4 days there are 300 flies.

a) Using the equation $A = Pe^{kt}$ where t is time in days, find the growth constant k for the fruit fly population.	b) Write an equation to represent the fruit fly population at any time t after the experiment has started.
c) Find the population after 5 days.	d) After how many days will the fly population reach 1000?

14) Chromium-48 has a short half-life of 21.6 hours. How long will it take 360 g of chromium-48 to decay to 11.25 g?

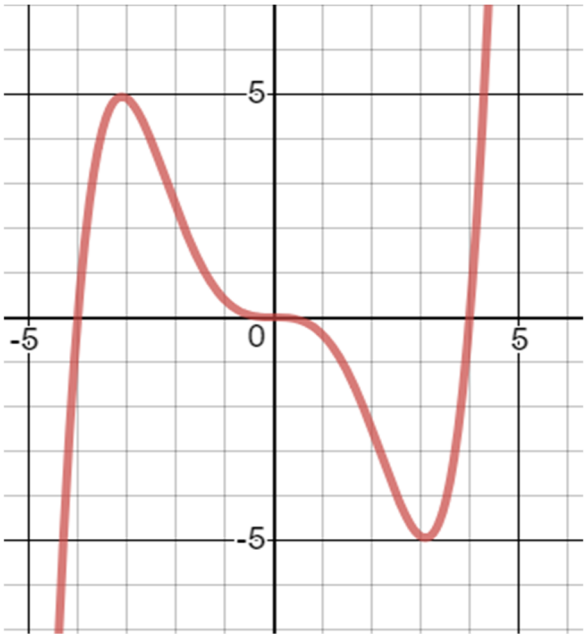
15) A 208 g sample of sodium-24 decays to 13.0 g within 60.0 hours. What is the half-life of this radioactive isotope?

16) A year after the purchase of a new car, its value is appraised at $18,000. Four years after its purchase, the car's value is $11, 054.

a) Write an equation in the form $y = ab^x$ that represents the value of the car after its purchase.

b) What does the value of "a" in your equation represent?

c) If the car's owner wants to sell the car when its value is still $5,000 or higher, when should he sell the car?



17) Determine each of the following for the given polynomial function given at points of inflection at (-2, 2), (0, 0) and (2, -3).

Relative Minimum(s): _____

Relative Maximum(s): _____

Intervals of decrease: _____

Interval(s) of increase: _____

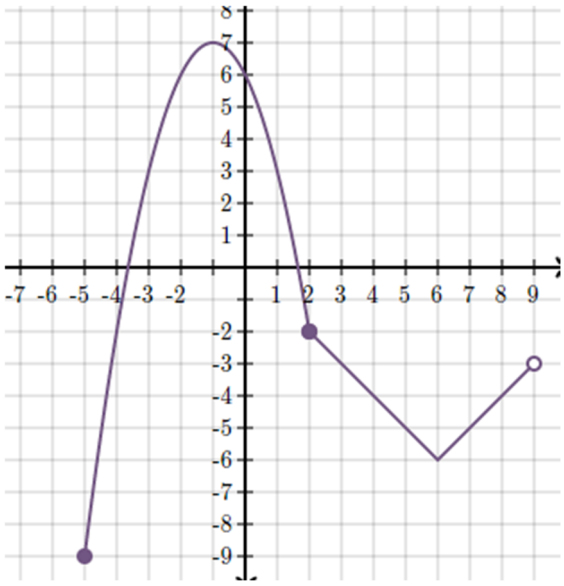
Concave Up Interval(s):_____

Concave Down Interval(s): _____

18*) Write an equation for each of the following piecewise functions.

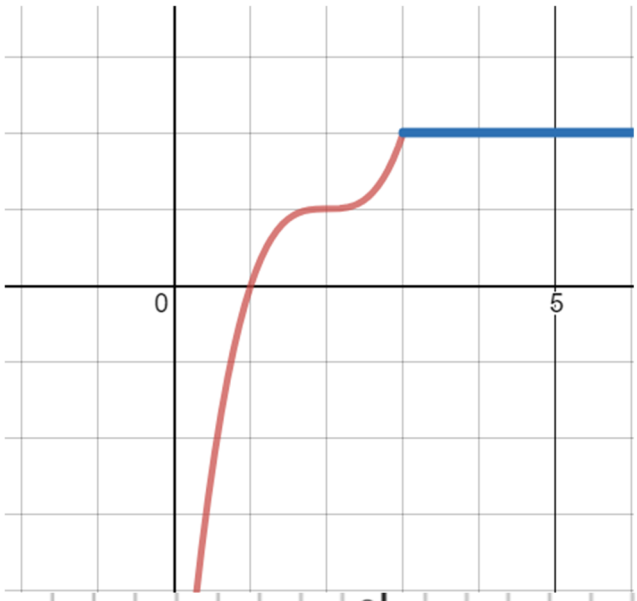
a)

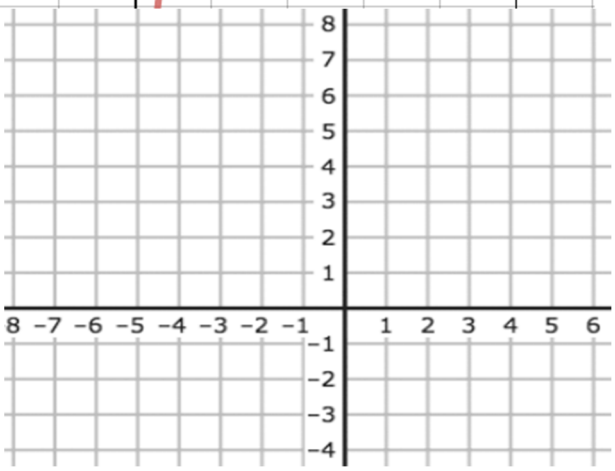
$f(x) =$



b)

$f(x) =$



19*) Make a careful sketch of the piecewise function below:

$$f(x) = \begin{cases} -\frac{1}{2}x + 3 & x \le -2 \\ -(x+1)^3 + 3 & -2 < x < 0 \\ |x-2| & x \ge 0 \end{cases}$$