

Advanced Algebra with Trig
7.1-7.4 Study Guide

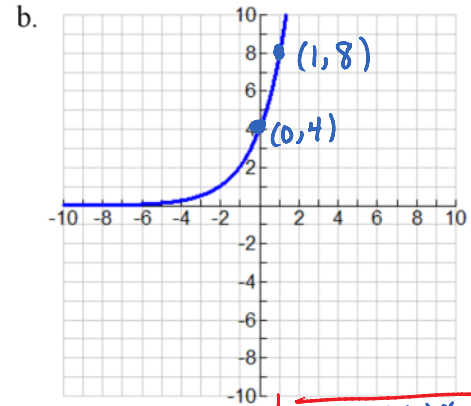
Name: key
Period:

1. Write the exponential equation represented below:

a.

x	-1	0	1	2	3	4
f(x)	27	9	3	1	1/3	1/9

$y = 9\left(\frac{1}{3}\right)^x$



x	y
0	4
1	8

$\times 2$

$y = 4(2)^x$

c.

x	-3	-2	-1	0	1
f(x)	2	10	50	250	1250

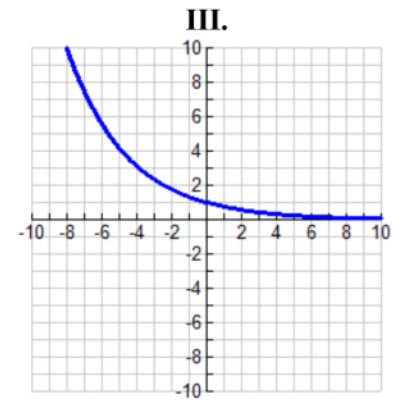
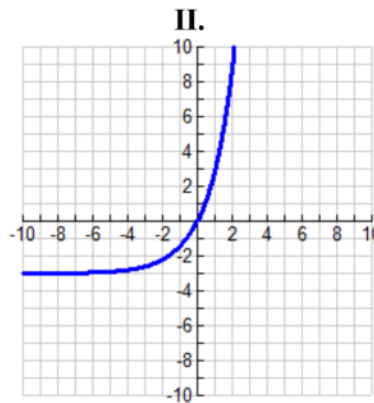
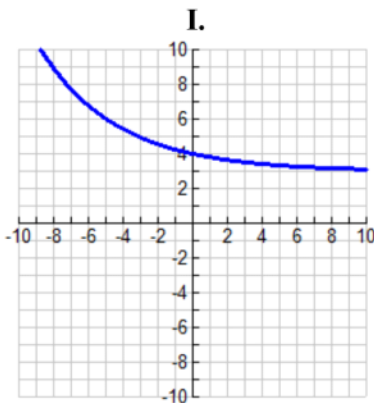
$y = 250(5)^x$

2. Match the graph with its function.

a. $f(x) = 3 \cdot 2^{x-3}$ II

b. $g(x) = \left(\frac{3}{4}\right)^x$ III

c. $h(x) = \left(\frac{4}{5}\right)^x + 3$ I



3. Simplify the expression:

a. $4e^3 \cdot e^5$
 $4e^8$

b. $(-4e^{2x})^3$
 $-64e^{6x}$

c. $\frac{e^{5x}}{4e^2}$
 $\frac{e^{5x-2}}{4}$

d. $\frac{9e^{6x}}{3e^{4x}}$
 $3e^{6x-4x}$
 $3e^{2x}$

4. Evaluate the logarithm:

a. $\log_2 8$ $2^? = 8$

b. $\log_5 5$ $5^? = 5$

c. $\log_6 1$ $6^? = 1$

d. $\log_3 27$ $3^? = 27$

4. Evaluate the logarithm:

a. $\log_2 8$ $2^3 = 8$
3

b. $\log_5 5$ $5^1 = 5$
1

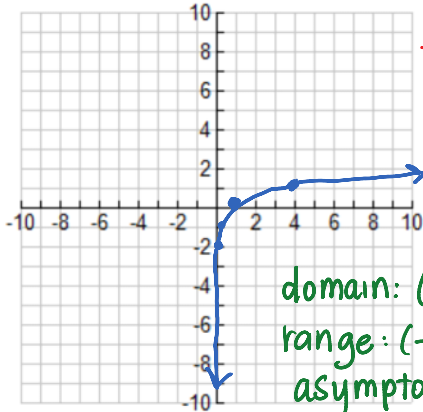
c. $\log_6 1$ $6^0 = 1$
0

d. $\log_{\frac{1}{3}} 27$ $(\frac{1}{3})^{-3} = 27$
 $3e^{-}$
-3

5. Graph the function. State the domain, range and equation of the asymptote.

a. $y = \log_4 x$

$f^{-1}(x) = 4^x$

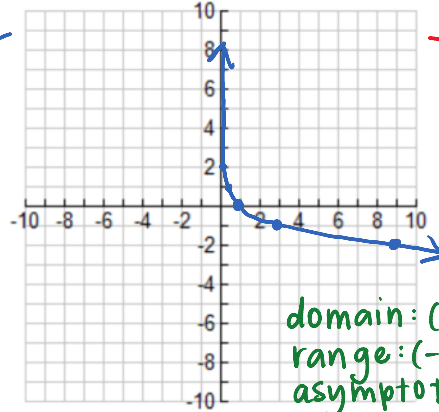


$f^{-1}(x)$		$y = \log_4 x$	
x	y	x	y
-2	1/16	1/16	-2
-1	1/4	1/4	-1
0	1	1	0
1	4	4	1
2	16	16	2

domain: $(0, \infty)$
range: $(-\infty, \infty)$
asymptote: $x = 0$

b. $y = \log_{\frac{1}{3}} x$

$f^{-1}(x) = (\frac{1}{3})^x$



$f^{-1}(x)$		$y = \log_{\frac{1}{3}} x$	
x	y	x	y
-2	9	9	-2
-1	3	3	-1
0	1	1	0
1	1/3	1/3	1
2	1/9	1/9	2

domain: $(0, \infty)$
range: $(-\infty, \infty)$
asymptote: $x = 0$

6. CALC OK. A population of a town has grown at a rate of 3.1% per year ever since it was founded. The current population is approximately 10,000 people. Predict the population of the town 4 years from now.

$r = 3.1\% = 0.031$

$a = 10,000$

$t = 4$

$y = a(1+r)^t$

$y = 10000(1+0.031)^4$

$\approx 11,299$ people

7. CALC OK. The Morgans invested \$100,000 in the stock market with a 2.5% annual interest rate compounded monthly.

a. How much will the Morgans' stock be worth in 7 years?

$P = 100,000$

$r = 2.5\% = 0.025$

$n = 12$

$t = 7$

$y = P(1 + \frac{r}{n})^{nt}$
 $y = 100000(1 + \frac{0.025}{12})^{12 \cdot 7}$

$\approx \$119,102.94$

b. What if the interest was compounded continuously. How much will the Morgans' stock be worth in 7 years?

$y = Pe^{rt}$

$y = 100000e^{0.025 \cdot 7}$

$\approx \$119,124.62$

8. CALC OK. A company bought a piece of machinery valued at \$55,000 in 2005. It depreciates at a rate of 8% per year. What will the value of the machinery be in 2017?

decay!

8. CALC OK. A company bought a piece of machinery valued at \$55,000 in 2005. It depreciates at a rate of 8% per year. What will the value of the machinery be in 2017? decay!

$$a = 55,000$$

$$r = 8\% = 0.08$$

$$t = \frac{2017}{-2005}$$
$$12$$

$$y = a(1-r)^t$$

$$y = 55,000(1-0.08)^{12}$$

$$\approx \boxed{\$20,221.65}$$