

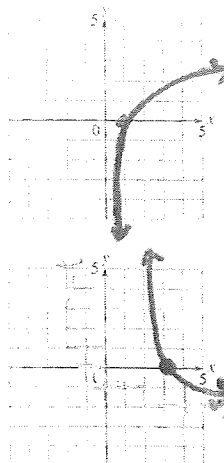
Standard 5 Review:

Name: key

1. Sketch the graph of the following functions.

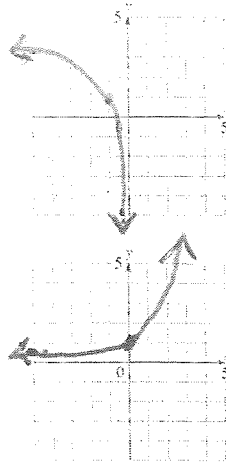
1. $f(x) = \ln(x)$

(1)



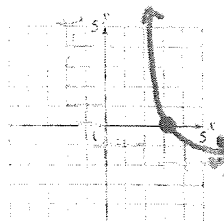
2. $f(x) = \ln(-x) + 1$

(2)



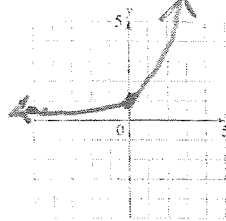
3. $f(x) = -\ln(x - 2)$

(3)



4. $f(x) = e^x$

(4)



2. Evaluate the following.

a. $\log_3(81) = 4$

b. $\log_2(1/8) = -3$

3. Rewrite the following exponential equations as log equations.

a. $4^5 = 1024$

$\log_4(1024) = 5$

b. $e^2 = 7.39$

$\ln(7.39) = 2$

4. Use the change of base formula to write the following as a quotient of Common logs and Natural logs.

a. $\log_7(13) = \frac{\log(13)}{\log(7)} = \frac{\ln(13)}{\ln(7)}$

b. $\ln(4) = \frac{\log(4)}{\log(e)} = \frac{\ln(4)}{\ln(e)}$

5. Use the properties of logarithms to rewrite the expressions as the sum or difference and/or the constant multiple of logs.

a. $\log\left(\frac{\sqrt{a}}{b^6}\right)$

$\frac{1}{2}\log(a) - 6\log(b)$

b. $\ln(x^4 \cdot \sqrt[3]{y})$

$4\ln(x) + \frac{1}{3}\ln(y)$

6. Use the properties of logarithms to rewrite the expressions as a single log.

a. $3\ln(x) + \frac{1}{2}\ln(y)$

$\ln(x^3 \sqrt{y})$

b. $5\log(p^2) - 2\log(q^3) - \frac{1}{2}\log(r) + \frac{1}{3}\log(s)$

$\log\left(\frac{p^{10} \sqrt{s}}{q^6 \sqrt{r}}\right)$

7. Find the exact value of the following logs.

a. $\log_{1.5}(2.25)$

2

b. $10e^{\ln(0.1)}$

1

c. $\log_{37}(1)$

0

d. $3\ln\sqrt[3]{e} + 9\ln(1)$

1

8. Use the properties of logarithms simplify the following if $\log_x(2) = 2.1$, $\log_x(3) = 4.6$, and $\log_x(5) = 6.9$.

a. $\log_x(10)$

9.0

b. $\log_x \sqrt{30}$

6.8

9. Solve for x.

a. $3e^x = 12$

$x = 1.39$

b. $\log_3(x) = 2.5$

$x = 15.59$

c. $\log(x-8) = 2$

$x = 108$

d. $4^{2x+6} = 1024$

$x = -\frac{1}{2}$

e. $4\log_2(3x+2) = 20$

$x = 10$

f. $5^{(2x-1)} - 8 = 117$

$x = 2$

g. $\ln(3x-2)^2 + 6 = 14$

$x = 18.9$

h. $\log(6x) - \log(x-2) = 1$

$x = 5$

10. How long will it take an investment to double if it is compounded monthly at 8.5% ?

$$t = 8.2 \text{ years}$$

11. How many years would it take to produce \$1,000,000 from an investment of \$250,000 if the interest rate is 12%, compounded quarterly?

$$t = 11.7 \text{ years}$$

12. What would the interest rate need to be, to produce \$100,000 from an initial investment of \$20,000 compounded continuously for 15 years?

$$r = 0.107 = 10.7\%$$

13. How much would you need to invest, if you needed \$400,000 in 10 years and you were earning 7.5%, compounded yearly?

$$P = \$194,077.57$$

14. Scappoosium 123 (^{123}Sc) has a half-life of 2112 years.

- a. Find its rate of decay (k)

$$k = -0.000328$$

If you started with 20g of ^{123}Sc , how much would you have after:

- b. 1000 years

$$Q = 14.4\text{g}$$

- c. 5000 years

$$Q = 3.9\text{g}$$

If I have 25g now, how much did I have:

- d. 500 years ago

$$C = 29.5\text{g}$$

- e. 1000 years ago

$$C = 34.7\text{g}$$

- f. If I have a sample that weighs 50g, how long until it weighs 15g?

$$t = 3668.5 \text{ years}$$