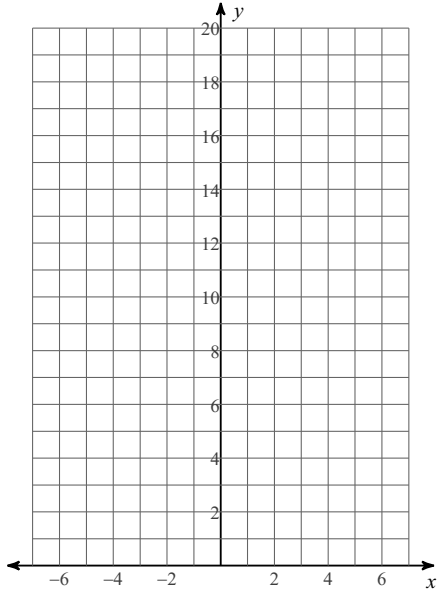


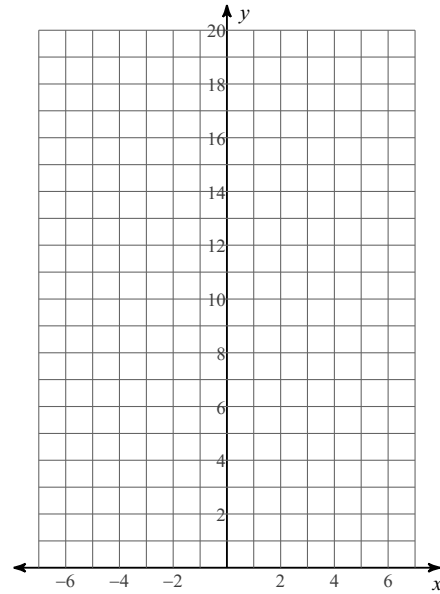
## Exponential and Logarithmic PRACTICE TEST

Sketch the graph of each function.

$$1) y = \frac{1}{2} \cdot 3^x$$

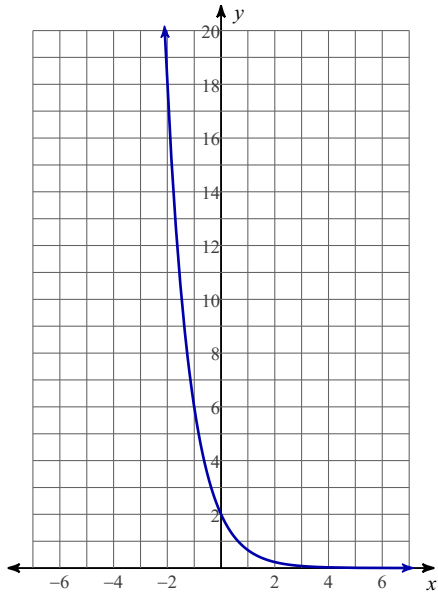


$$2) y = 5 \cdot \left(\frac{1}{2}\right)^x$$

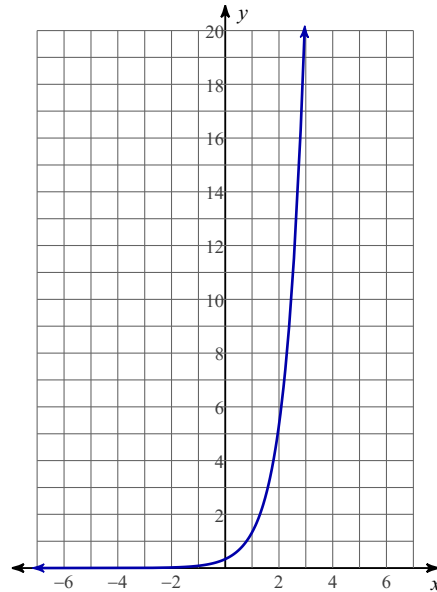


Tell whether the function shows growth or decay. Then graph.

3)



4)

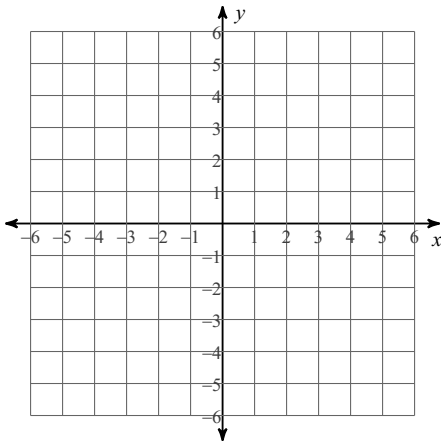


5) The average price of a movie ticket in 1990 was \$4.22. Since then, the price has increased by approximately 2.5% each year. Write an exponential function to model this situation, then find the price of a ticket in 2025.

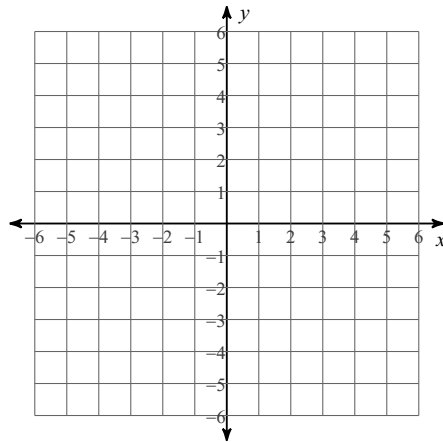
6) Manny bought a brand new car in 2015 for \$15,500. If the car depreciates by 14% each year, write an exponential function to model the situation, then find the value of the care in 2020.

**Sketch the graph of each line. Then find it's inverse and graph that as well.**

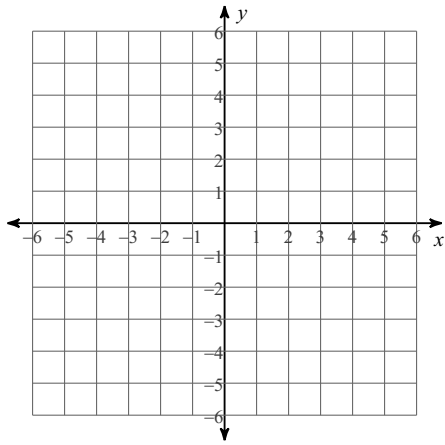
7)  $y = \frac{6}{5}x + 3$



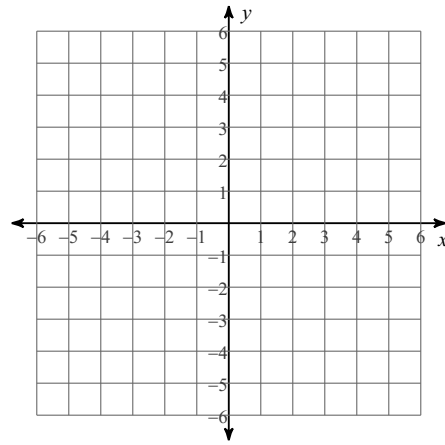
8)  $y = -\frac{9}{4}x + 5$



9)  $y = -2x + 1$



10)  $y = 4$



**Rewrite each equation in logarithmic form.**

11)  $6^3 = 216$

12)  $5^{-6} = x$

13)  $11^2 = 121$

14)  $y^x = \frac{45}{47}$

**Find the inverse of each function. Describe the domain and the range of the inverse function.**

15)  $y = \log_4(-2x) - 10$

16)  $y = 2 \log_{\frac{1}{2}}(x - 9)$

17)  $y = 5^x - 6$

18)  $y = 4^{\frac{x}{5}}$

a) Use a calculator to approximate each to the nearest thousandth. b) Explain what a logarithm is, you can refer to part a if you would like to.

19)  $\log_7 50$

20)  $\log_2 8$

**Expand each logarithm.**

21)  $\log_5 (x^5 y^2)$

22)  $\log_3 \sqrt[3]{u \cdot v \cdot w}$

**Condense each expression to a single logarithm.**

23)  $2\log_2 x - 4\log_2 y$

24)  $3\log_9 u + 5\log_9 v$

**Solve each equation. Round your answers to the nearest ten-thousandth. Show work for full credit**

25)  $4e^{2n-0.7} + 10 = 107$

26)  $-2e^{3-8.2m} + 4 = -12$

**Solve each equation. Show work for full credit**

27)  $\log 30 = \log (m + 3)$

28)  $\log (2x - 4) = \log (-x + 5)$

29)  $\log_4 4x^2 - \log_4 9 = 2$

30)  $\log_2 6 + \log_2 -4x = 5$

**Solve each equation. Round your answers to the nearest ten-thousandth. Show work for full credit**

31)  $5 \cdot 20^{2n} = 6$

32)  $2^{k-5} + 4 = 92$

**Solve each equation. Show work for full credit**

33)  $-4 \log_9 (n + 10) = -16$

34)  $-2 + \log_4 -4m = -2$

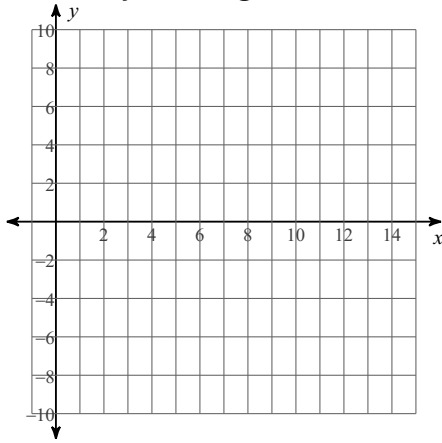
35) Jasmine invests \$2500 in a retirement account with a fixed annual interest rate of 8% compounded continuously. What will the account balance be after 12 years?

36) John invests a sum of money in a retirement account with a fixed annual rate of 3.5% compounded continuously. After 15 years, the balance reaches \$5832.08. What was the amount of the initial investment?

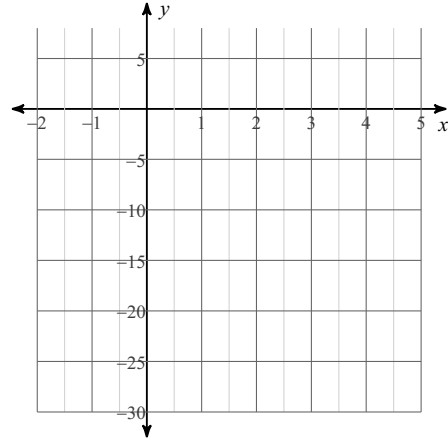
37) The function  $f(x) = \left(\frac{1}{2}\right)^x$  is translated 2 units left, reflected across the y-axis and vertically stretched by a factor of 3. What is the equation of the translated function?

38) The function  $f(x) = \log x$  is translated 2 units down, reflected across the y-axis and vertically compressed by a factor of 1/2. What is the equation of the translated function?

- 39) Using  $f(x) = 3 \log(x+2) - 7$ , graph the logarithmic function. Find the asymptote. Then describe how the graph is transformed from the graph of its parent function  $f(x) = \log x$ .



- 40) Using  $f(x) = -0.5 \cdot 4^{x-1}$ , graph the exponential function. Find the asymptote. Then describe how the graph is transformed from the graph of its parent function  $f(x) = 4^x$ .

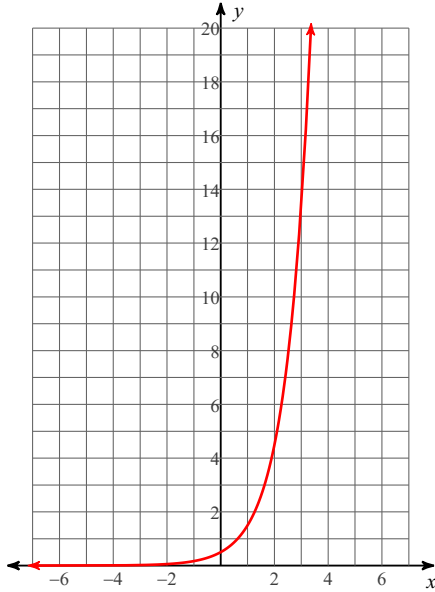


## Exponential and Logarithmic PRACTICE TEST

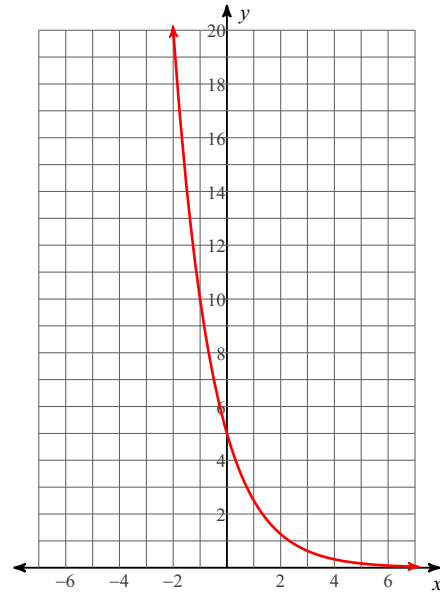
Date \_\_\_\_\_ Period \_\_\_\_\_

Sketch the graph of each function.

1)  $y = \frac{1}{2} \cdot 3^x$



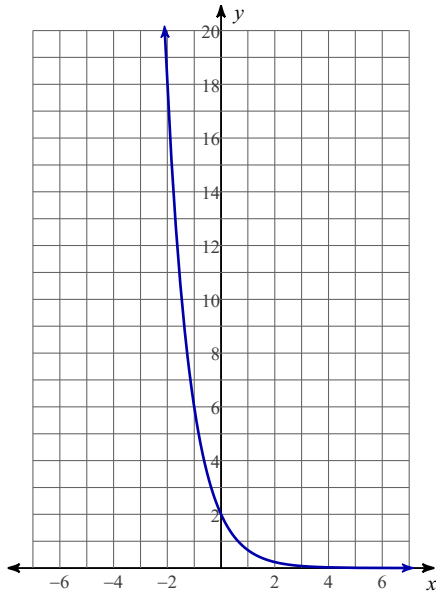
2)  $y = 5 \cdot \left(\frac{1}{2}\right)^x$



Tell whether the function shows growth or decay. Then graph.

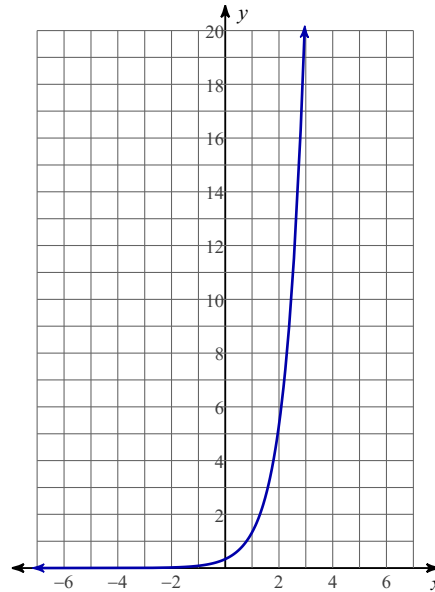
3)

$$y = 2 \cdot \left(\frac{1}{3}\right)^x$$



4)

$$y = \frac{1}{3} \cdot 4^x$$



- 5) The average price of a movie ticket in 1990 was \$4.22. Since then, the price has increased by approximately 2.5% each year. Write an exponential function to model this situation, then find the price of a ticket in 2025.

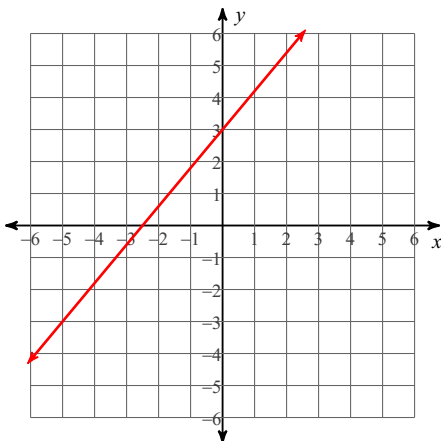
$$f(x) = 4.22(1+.025)^x ; \$10.01$$

- 6) Manny bought a brand new car in 2015 for \$15,500. If the car depreciates by 14% each year, write an exponential function to model the situation, then find the value of the care in 2020.

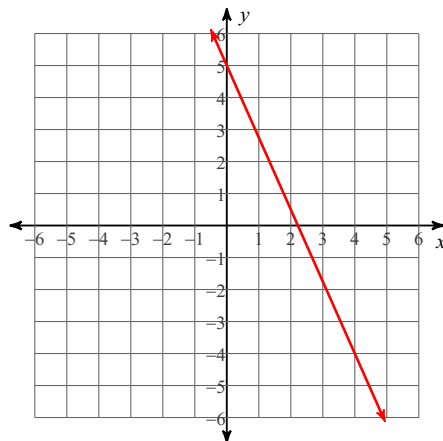
$$f(x) = 15500(1-.14)^x ; \$7291.62$$

**Sketch the graph of each line. Then find it's inverse and graph that as well.**

7)  $y = \frac{6}{5}x + 3$

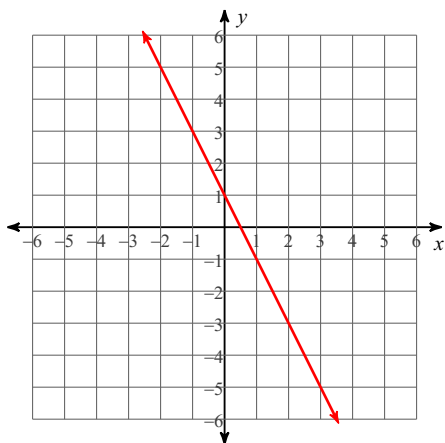


8)  $y = -\frac{9}{4}x + 5$

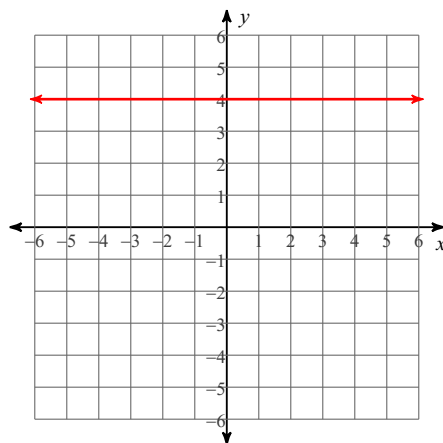




9)  $y = -2x + 1$



10)  $y = 4$



**Rewrite each equation in logarithmic form.**

11)  $6^3 = 216$

$\log_6 216 = 3$

12)  $5^{-6} = x$

$\log_5 x = -6$

13)  $11^2 = 121$

$\log_{11} 121 = 2$

14)  $y^x = \frac{45}{47}$

$\log_y \frac{45}{47} = x$

**Find the inverse of each function. Describe the domain and the range of the inverse function.**

15)  $y = \log_4 (-2x) - 10$

$y = \frac{4^{x+10}}{-2}$

16)  $y = 2 \log_{\frac{1}{2}} (x - 9) \quad y = \left(\frac{1}{2}\right)^{\frac{y}{2}} + 9$

17)  $y = 5^x - 6$

$y = \log_5 (x + 6)$

18)  $y = 4^{\frac{x}{5}}$

$y = \log_4 x^5$

a) Use a calculator to approximate each to the nearest thousandth. b) Explain what a logarithm is, you can refer to part a if you would like to.

19)  $\log_7 50$

2.01

20)  $\log_2 8$

3

Expand each logarithm.

21)  $\log_5 (x^5 y^2)$

$5\log_5 x + 2\log_5 y$

22)  $\log_3 \sqrt[3]{u \cdot v \cdot w}$

$\frac{\log_3 u}{3} + \frac{\log_3 v}{3} + \frac{\log_3 w}{3}$

Condense each expression to a single logarithm.

23)  $2\log_2 x - 4\log_2 y$

$\log_2 \frac{x^2}{y^4}$

24)  $3\log_9 u + 5\log_9 v$

$\log_9 (v^5 u^3)$

Solve each equation. Round your answers to the nearest ten-thousandth. Show work for full credit

25)  $4e^{2n-0.7} + 10 = 107$

1.9442

26)  $-2e^{3-8.2m} + 4 = -12$

0.1123

Solve each equation. Show work for full credit

27)  $\log 30 = \log (m + 3)$

{27}

28)  $\log (2x - 4) = \log (-x + 5)$

{3}

29)  $\log_4 4x^2 - \log_4 9 = 2$

{6, -6}

30)  $\log_2 6 + \log_2 -4x = 5$

$\left\{ -\frac{4}{3} \right\}$

**Solve each equation. Round your answers to the nearest ten-thousandth. Show work for full credit**

31)  $5 \cdot 20^{2n} = 6$

$0.0304$

32)  $2^{k-5} + 4 = 92$

$11.4594$

**Solve each equation. Show work for full credit**

33)  $-4 \log_9 (n + 10) = -16$

$\{6551\}$

34)  $-2 + \log_4 -4m = -2$

$\left\{-\frac{1}{4}\right\}$

35) Jasmine invests \$2500 in a retirement account with a fixed annual interest rate of 8% compounded continuously. What will the account balance be after 12 years?

$\$6529.24$

36) John invests a sum of money in a retirement account with a fixed annual rate of 3.5% compounded continuously. After 15 years, the balance reaches \$5832.08. What was the amount of the initial investment?

$\$3450$

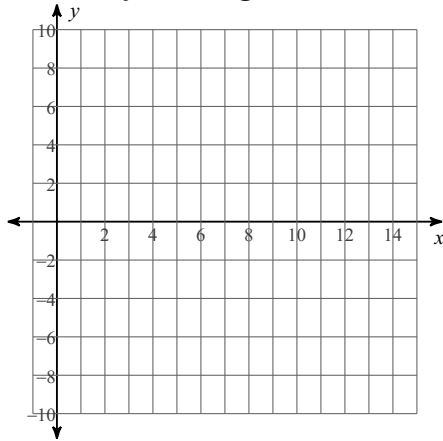
37) The function  $f(x) = \left(\frac{1}{2}\right)^x$  is translated 2 units left, reflected across the y-axis and vertically stretched by a factor of 3. What is the equation of the translated function?

$f(x) = 3 \cdot \left(\frac{1}{2}\right)^{-x+2}$

38) The function  $f(x) = \log x$  is translated 2 units down, reflected across the y-axis and vertically compressed by a factor of 1/2. What is the equation of the translated function?

$f(x) = -0.5 \log x - 2$

- 39) Using  $f(x) = 3 \log(x+2) - 7$ , graph the logarithmic function. Find the asymptote. Then describe how the graph is transformed from the graph of its parent function  $f(x) = \log x$ .



vertical stretch of 3, shift 2 to the left and down 7 units

- 40) Using  $f(x) = -0.5 \cdot 4^{x-1}$ , graph the exponential function. Find the asymptote. Then describe how the graph is transformed from the graph of its parent function  $f(x) = 4^x$ .

reflection over the y-axis.

