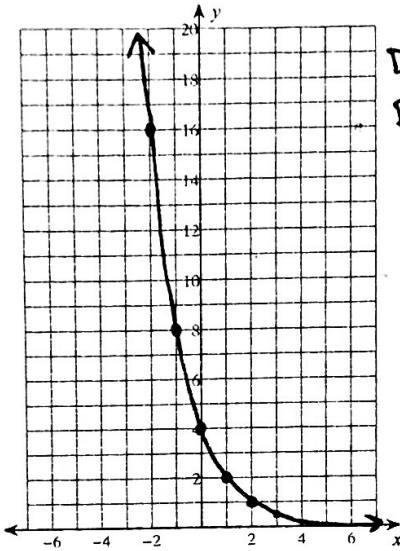


Unit 8 Review

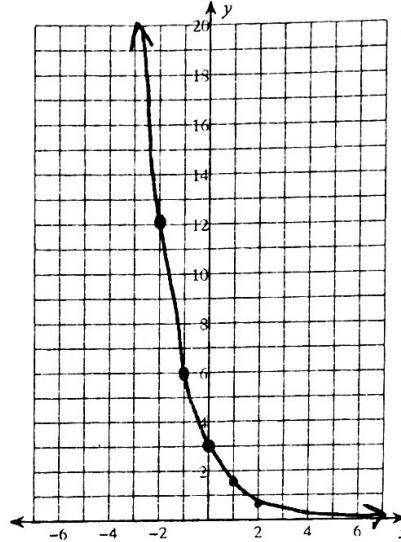
Sketch the graph of each function. Then state the domain and range.

1) $y = 4 \cdot \left(\frac{1}{2}\right)^x$



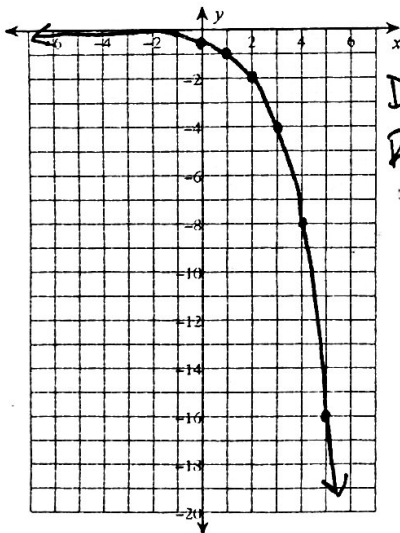
Domain: $(-\infty, \infty)$
Range: $(0, \infty)$

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



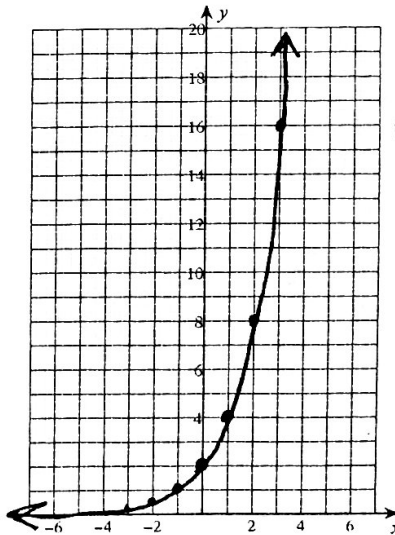
Domain: $(-\infty, \infty)$
Range: $(0, \infty)$

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



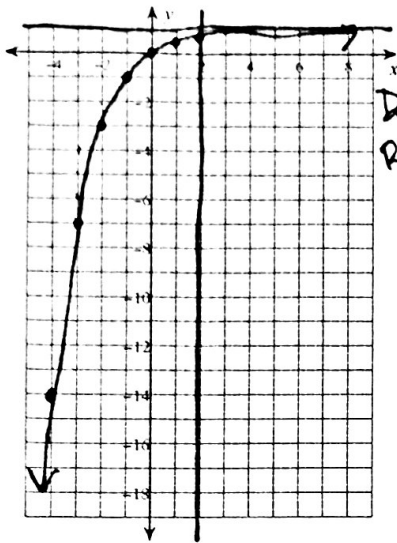
Domain: $(-\infty, \infty)$
Range: $(-\infty, 0)$

4) $y = 2 \cdot 2^x$



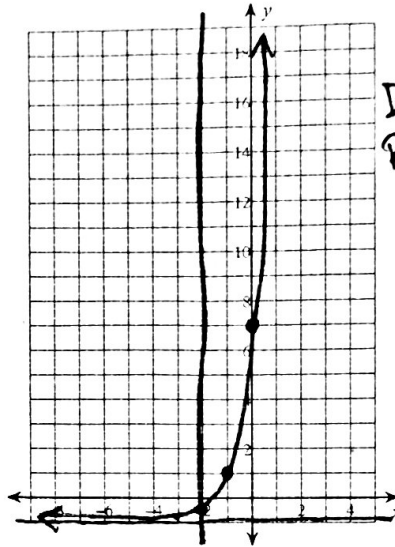
Domain: $(-\infty, \infty)$
Range: $(0, \infty)$

$$5) y = -\frac{1}{4} \cdot \left(\frac{1}{2}\right)^{x-2} + 1$$



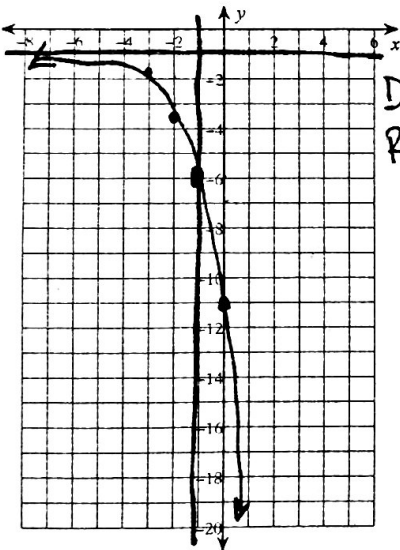
Domain: $(-\infty, \infty)$
Range: $(-\infty, 1)$

$$6) y = \frac{1}{2} \cdot 4^{x+2} - 1$$



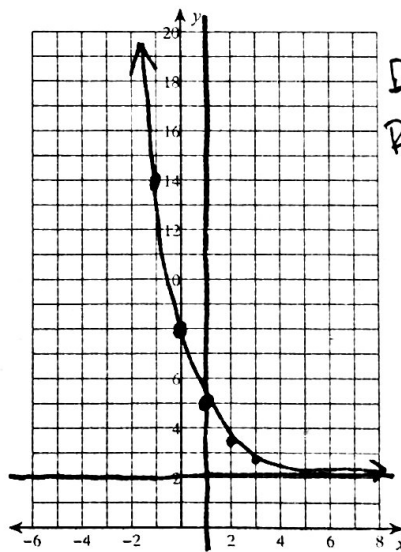
Domain: $(-\infty, \infty)$
Range: $(-1, \infty)$

$$7) y = -5 \cdot 2^{x+1} - 1$$



Domain: $(-\infty, \infty)$
Range: $(-\infty, -1)$

$$8) y = 3 \cdot \left(\frac{1}{2}\right)^{x-1} + 2$$



Domain: $(-\infty, \infty)$
Range: $(2, \infty)$

Find the amount in each account given that it is compounded annually.

- 9) principal: \$400
annual interest rate: 3.7%
time: 12 years

\$ 618.59

- 10) principal: \$5000
annual interest rate: 2.9%
time: 6 years

\$ 5935.57

- 11) principal: \$750
annual interest rate: 4.2%
time: 18 years

\$ 1572.82

- 12) The value of a car decreases by 8% each year. If you purchased the car for \$20,000, what would the car be worth after 6 years?

\$ 12,127.10

- 13) You have \$1000 that you can put into a savings account. You want to save \$5000 after 10 years. What interest rate do you need to accomplish your goal?

17%

- 14) You have \$650 that you can put into a savings account that accrues 3.5% annual interest. You want to save \$1200. How long will it take for your account to reach this amount?

17.9 years

Find the amount in a continuously compounded account for the given conditions.

- 15) principal: \$2000
annual interest rate: 3.1%
time: 5 years

\$ 2335.32

- 16) principal: \$600
annual interest rate: 2.6%
time: 4.5 years

\$ 674.47

- 17) principal: \$1500
annual interest rate: 1.4%
time: 8 years

\$ 1677.77

- 18) A student wants to save \$10,000 for college in 6 years. How much should be put into an account that pays 4.2% annual interest compounded continuously?

\$ 7772.45

- 19) A man wants to save 1 million dollars for his retirement fun over a period of 35 years. If he makes no additional deposits, how much should be put into an account that pays 2.7% annual interest compounded continuously?

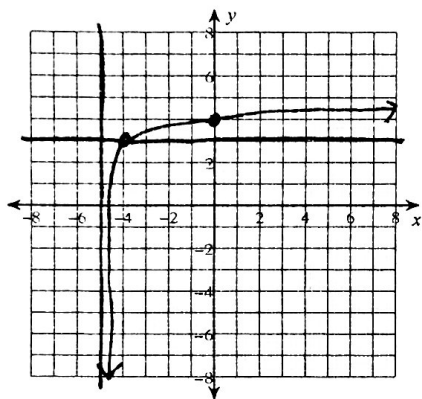
\$388,679.57

- 20) How long would it take to double your principal in an account that pays 3.5% annual interest compounded continuously?

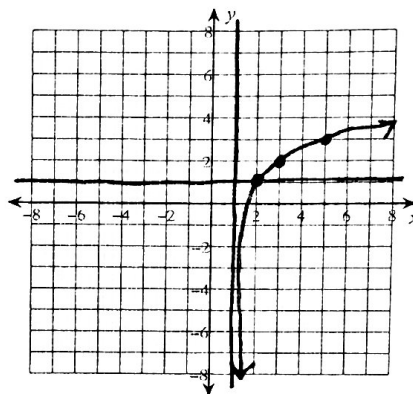
19.8 years

Identify the domain and range of each. Then sketch the graph.

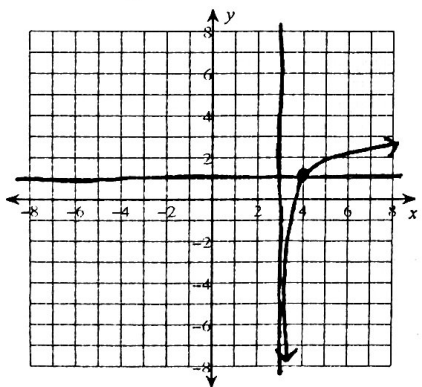
21) $y = \log_5(x + 5) + 3$



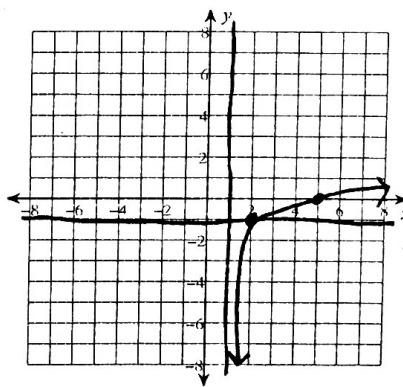
22) $y = \log_2(x - 1) + 1$



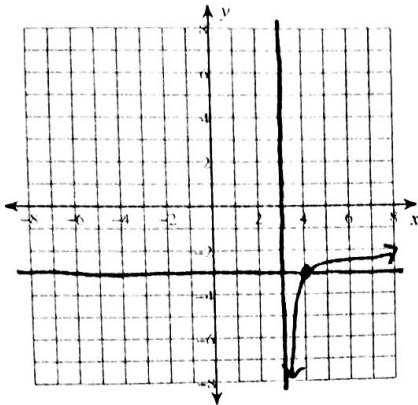
23) $y = \log_6(x - 3) + 1$



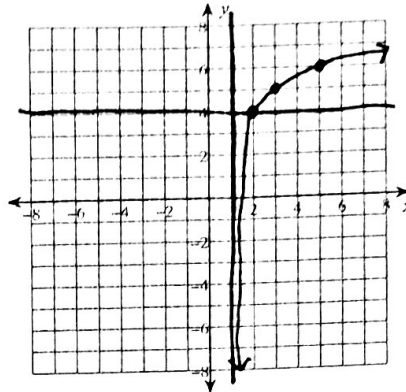
24) $y = \log_4(x - 1) - 1$



25) $y = \log_6(x - 3) - 3$



26) $y = \log_2(x - 1) + 4$



Evaluate each expression.

27) $\log_4 16 = 2$

29) $\log_2 8 = 3$

31) $\log_4 64 = 3$

33) $\log_4 1 = 0$

35) $\log 0 = \text{DNE}$

28) $\log_7 49 = 2$

30) $\log_3 243 = 5$

32) $\log_6 \frac{1}{216} = -3$

34) $\log_3 81 = 4$

36) $\log_5 -25 = \text{DNE}$

Expand each logarithm.

37) $\log_4(a^3 \cdot b)^5$

$15\log_4 a + 5\log_4 b$

39) $\log_9(xy^4)^5$

$5\log_9 x + 20\log_9 y$

38) $\ln(x \cdot y \cdot z^3)$

$\ln x + \ln y + 3\ln z$

40) $\log_3(z^2 \sqrt{x})$

$2\log_3 z + \frac{1}{2}\log_3 x$

$$41) \log_7 \left(\frac{x^6}{y} \right)^4$$

$$24 \log_7 x - 4 \log_7 y$$

$$42) \log_2 \frac{x^2}{y^4}$$

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

Condense each expression to a single logarithm.

$$43) 2 \log_5 z + \frac{\log_5 x}{2}$$

$$\log_5 (z^2 \sqrt{x})$$

$$44) 25 \log_4 x - 5 \log_4 y$$

$$\log_4 \left(\frac{x^{25}}{y^5} \right)$$

$$45) 3 \log_6 u + 3 \log_6 v$$

$$\log_6 (u^3 v^3)$$

$$46) 5 \log_6 x - 15 \log_6 y$$

$$\log_6 \left(\frac{x^5}{y^{15}} \right)$$

$$47) \log_7 x + \log_7 y + 3 \log_7 z$$

$$\log_7 (xyz^3)$$

$$48) \log_3 x + \log_3 y + 3 \log_3 z$$

$$\log_3 (xyz^3)$$

Solve each equation.

$$49) 27^{x-1} = \left(\frac{1}{81} \right)^{x-2}$$

$$x = \frac{11}{7}$$

$$50) 16^{3x-1} = 64^{2x}$$

No Solution

$$51) 36^a = \frac{1}{6}$$

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

$$52) 27^{2x} = \frac{1}{243}$$

$$x = -\frac{5}{6}$$

$$53) 25^{2m+2} = 625^{3m-2}$$

$$m = \frac{3}{2}$$

$$54) 32^{3v} = 64^{-3v+1}$$

$$v = \frac{2}{11}$$

Solve each equation. Write final answers using log base 10.

$$55) 12^{x+2} + 6 = 25$$

$$x = \frac{\log 19}{\log 12} - 2$$

$$56) 3^{x+9} + 1 = 53$$

$$x = \frac{\log 52}{\log 3} - 9$$

$$57) 6 \cdot 11^{a-3} = 5$$

$$a = \frac{\log 5}{\log 11} - \frac{\log 6}{\log 11} + 3$$

$$58) 6^{4n} + 1 = 8$$

$$n = \frac{\frac{\log 6}{\log 7}}{4}$$

$$59) 10 \cdot 15^{n+10} = 90$$

$$n = \frac{\log 9}{\log 15} - 10$$

$$60) -2 \cdot 16^{x-10} = -24$$

$$x = \frac{\log 12}{\log 16} + 10$$

Solve each equation.

$$61) \log_2(x^2 - 4) - \log_2 3 = 5$$

$$x = 10, -10$$

$$62) \log_2(x - 4) - \log_2 x = 3$$

No Solution

$$63) \log_8 (x+7) - \log_8 4 = 1$$

$$x = 25$$

$$64) \log_7 (x-7) + \log_7 5 = 1$$

$$x = \frac{42}{5}$$

$$65) \log_3 5 + \log_3 2x = 2$$

$$x = \frac{9}{10}$$

$$66) \log (x+48) + \log x = 2$$

$$x = 2$$