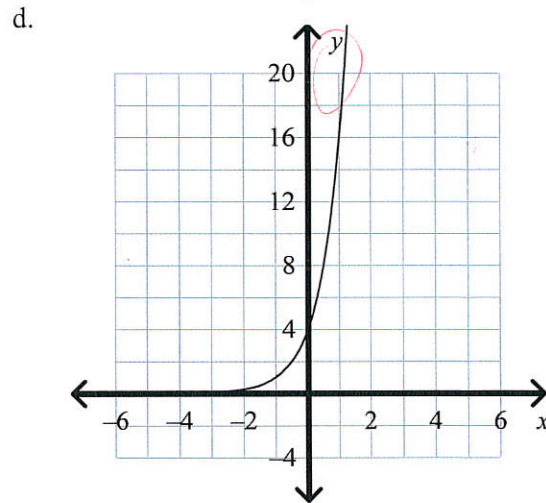
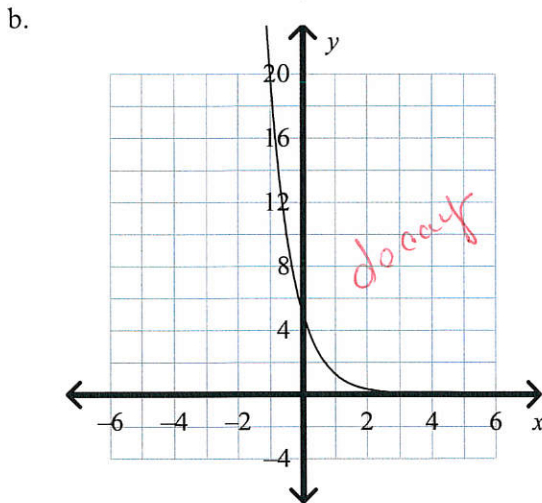
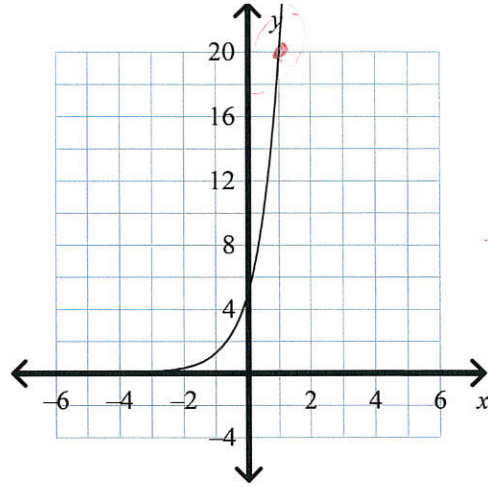
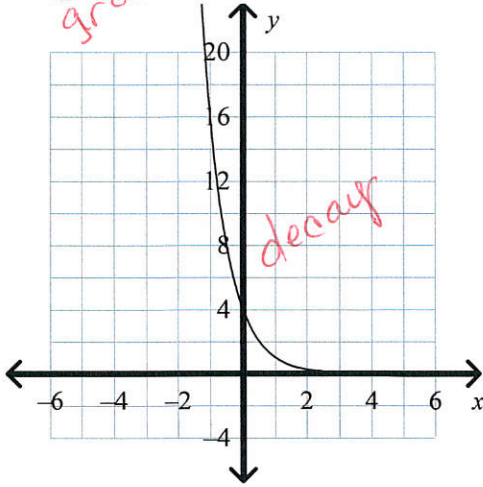


Chapter 7 PRACTICE Test

Graph the exponential function.

C 1. $y = 5(4)^x$
 a. *growth* $\frac{x, y}{1, 20}$ (c.)



B 2. An initial population of 205 quail increases at an annual rate of 10%. Write an exponential function to model the quail population. What will the approximate population be after 4 years?

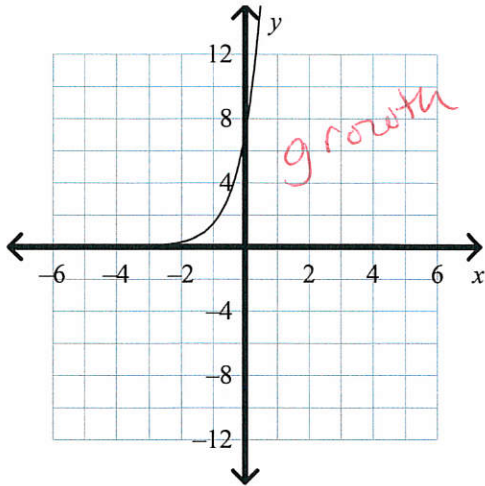
- a. $f(x) = 205(10)^x$; 2,050,000 c. $f(x) = 205(0.1)^x$; 300
 b. $f(x) = 205(1.1)^x$; 300 d. $f(x) = (205 \cdot 0.1)^x$; 176,610

$y = ab^x$
 $y = 205(1.1)^4$
 $100\% + 10\% = 110\%$

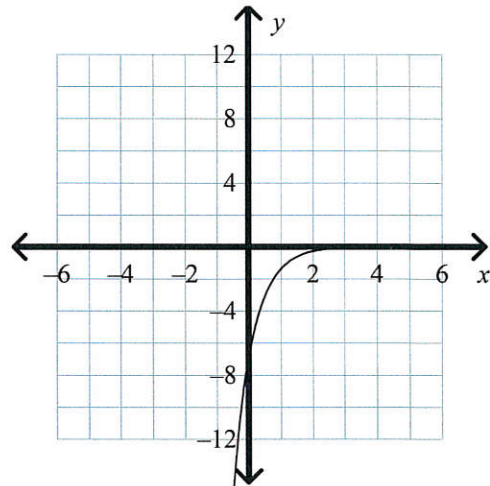
Graph the function.

D 3. $y = 7\left(\frac{1}{5}\right)^x$ *< 1 decay*

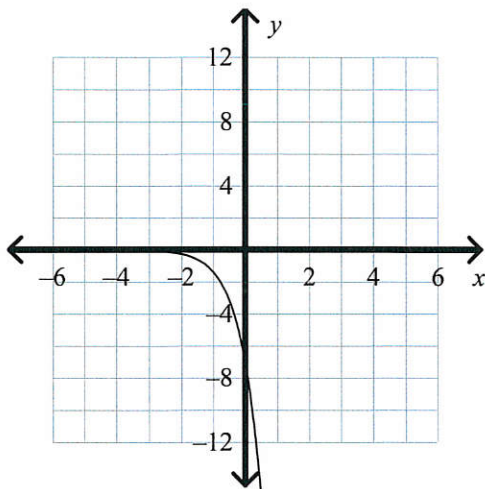
a.



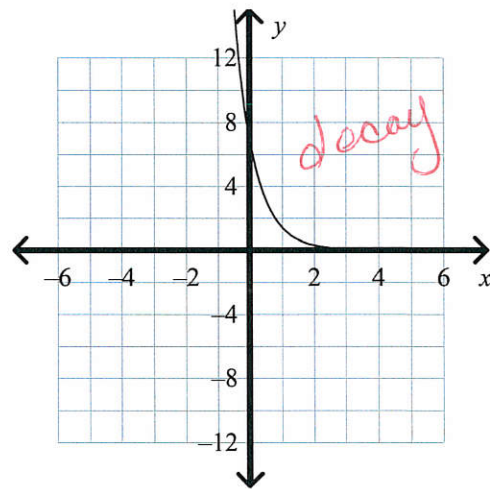
c.



b.



d.



B

4. Suppose you invest \$1200 at an annual interest rate of 7.4% compounded continuously. How much will you have in the account after 30 years?
- a. \$75,453.68 b. \$11,048.80 c. \$38,765.04 d. \$7,241.50

Evaluate the logarithm.

B

5. $\log_5 \frac{1}{125} = x$

- a. -2 b. -3 c. 3 d. 5

*$A = Pe^{rt} = 1200e^{(0.074 \times 30)}$
 $5^x = \frac{1}{125} \rightarrow 5^x = \frac{1}{5^3} \rightarrow 5^x = 5^{-3}$*

B

6. $\log 0.01$ *calculator base 10*

- a. -10 b. -2 c. 2 d. 10

- B 7. The pH of a liquid is a measure of how acidic or basic it is. The concentration of hydrogen ions in a liquid is labeled $[H^+]$. Use the formula $pH = -\log[H^+]$ to find the pH level, to the nearest tenth, of a liquid with $[H^+]$ about 7.8×10^{-6} . *calculator.*
- a. -6.9 b. 5.1 c. 6.0 d. 6.9

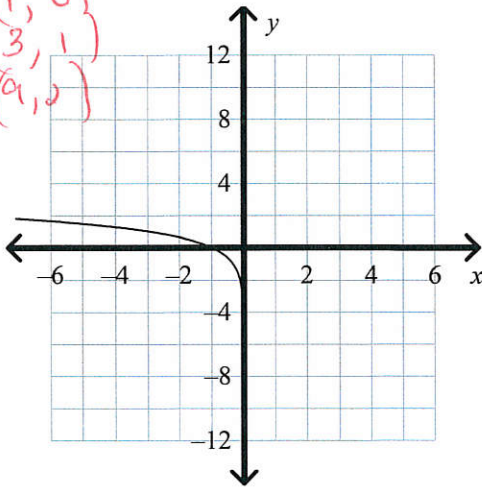
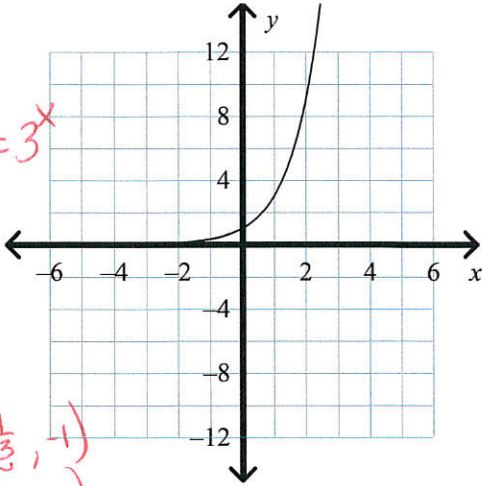
Graph the logarithmic equation.

C 8. $y = \log_3 x$
a.

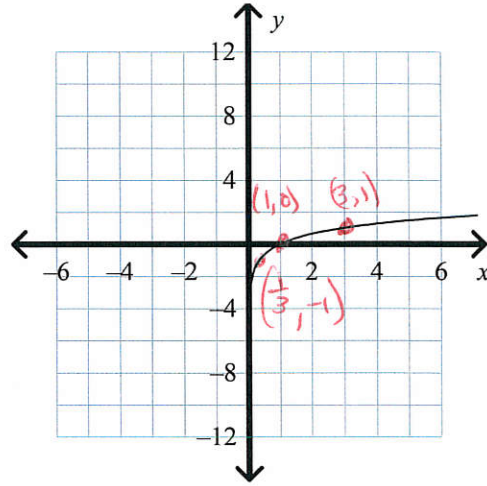
$3^y = x$
Inverse: $y = 3^x$

| x | y |
|----|---------------|
| -1 | $\frac{1}{3}$ |
| 0 | 1 |
| 1 | 3 |
| 2 | 9 |

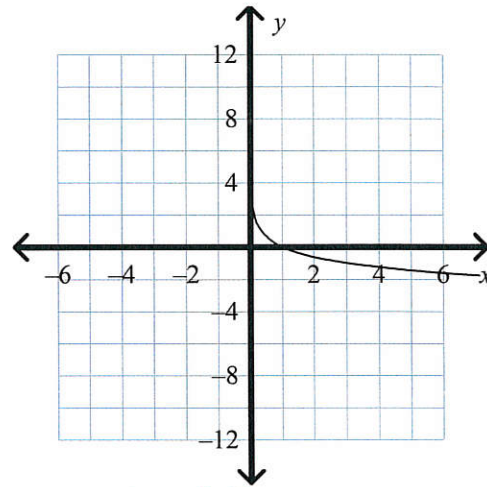
inverse \rightarrow $(\frac{1}{3}, 1)$
 $(1, 0)$
 $(3, 1)$
 $(9, 2)$



c.



d.



B

9. Use the Change of Base Formula to evaluate $\log_4 57$.

- a. 1.756 c. 4.043
b. 2.916 d. 1.011

$= \frac{\log 57}{\log 4} =$

Solve the exponential equation.

10. $4^{3x} = 8$ $2^{2 \cdot 3x} = 2^3$ $\frac{6x}{6} = \frac{3}{6}$
- a. 2 b. $\frac{1}{2}$ c. 6 d. $\frac{5}{6}$
11. Solve $3^{6x} = 40$. Round to the nearest ten-thousandth.
- a. 15.5416 b. 0.5596 c. 1.8740 d. 20.1466
- $\log 3^{6x} = \log 40 \rightarrow \frac{6x \log 3}{6 \log 3} = \frac{\log 40}{6 \log 3}$

Solve the logarithmic equation. Round to the nearest ten-thousandth if necessary.

12. $3 \log 2x = 4$ $\rightarrow \log_{10} 2x = \frac{4}{3}$ $\rightarrow 10^{\frac{4}{3}} = 2x \rightarrow x = \frac{10^{4/3}}{2} \approx 10.77$
- a. 10.7722 b. 5 c. 2.7826 d. 0.6309
13. Solve $\log(3x + 14) = 2$. $\rightarrow 10^2 = 3x + 14 \rightarrow 100 = 3x + 14 \rightarrow 86 = 3x$
- a. $\frac{86}{3}$ b. $\frac{100}{3}$ c. -4 d. 86
14. $\log(x + 9) - \log x = 3$ $\log_{10} \frac{x+9}{x} = 3 \rightarrow 10^3 = \frac{x+9}{x} \rightarrow \frac{1000}{1} = \frac{x+9}{x}$
- a. 0.0090 b. 0.3103 c. 3.2222 d. 111 $\rightarrow 1000x = x + 9$
 $999x = 9$
 $x = .0090$
15. $2 \log 4 - \log 3 + 2 \log x - 4 = 0$ $\rightarrow \log_{10} \frac{16x^2}{3} = 4$
- a. 12.3308 b. 43.3013 c. 86.6025 d. 1875
16. Simplify $\ln e^3$. $(\text{can't take log of negative})$ $10^4 = \frac{16x^2}{3} \rightarrow 10000 = \frac{16x^2}{3} \rightarrow 16x^2 = 30000$
 $\sqrt{x^2} = \sqrt{\frac{30000}{16}}$
 $x = \pm 43.3013$
- a. 3 b. $\frac{1}{3e}$ c. $3e$ d. $\frac{1}{3}$
17. Solve $\ln(2x - 7) = 5$. Round to the nearest thousandth. $2x - 7 = e^5$
 $2x = e^5 + 7 \rightarrow x = \frac{(e^5 + 7)}{2}$
- a. 77.707 b. 70.707 c. 151.913 d. 141.413
18. Solve $\ln x - \ln 6 = 0$. $e^{\ln \frac{x}{6}} = e^0 \rightarrow \frac{x}{6} = 1 \rightarrow x = 6$
- a. 6 b. $6e$ c. e^6 d. $\ln 6$

Use natural logarithms to solve the equation. Round to the nearest thousandth.

19. $\frac{4e^{4x+3}}{4} = \frac{11}{4}$ $\ln e^{4x+3} = \ln(\frac{11}{4}) \rightarrow 4x+3 = \ln(\frac{11}{4}) \rightarrow 4x = \ln(\frac{11}{4}) - 3 \rightarrow x = \frac{(\ln(\frac{11}{4}) - 3)}{4}$
- a. 0.173 b. 1.003 c. 0.313 d. -0.497
20. The sales of lawn mowers t years after a particular model is introduced is given by the function $y = 5500 \ln(9t + 4)$, where y is the number of mowers sold. How many mowers will be sold 2 years after a model is introduced? Round the answer to the nearest whole number.
- a. 7,383 mowers c. 15,901 mowers
b. 37,897 mowers d. 17,001 mowers
- $y = 5500 \ln(18 + 4)$
 $= 5500 \ln(22)$

Chapter 7 PRACTICE Test
Answer Section

- | | |
|------------|--|
| 1. ANS: C | OBJ: 7-1.1 To model exponential growth and decay |
| 2. ANS: B | OBJ: 7-1.1 To model exponential growth and decay |
| 3. ANS: D | OBJ: 7-2.1 To explore the properties of functions of the form $y = ab^x$ |
| 4. ANS: B | OBJ: 7-2.2 To graph exponential functions that have base e |
| 5. ANS: B | OBJ: 7-3.1 To write and evaluate logarithmic expressions |
| 6. ANS: B | OBJ: 7-3.1 To write and evaluate logarithmic expressions |
| 7. ANS: B | OBJ: 7-3.1 To write and evaluate logarithmic expressions |
| 8. ANS: C | OBJ: 7-3.2 To graph logarithmic functions |
| 9. ANS: B | OBJ: 7-4.1 To use the properties of logarithms |
| 10. ANS: B | OBJ: 7-5.1 To solve exponential and logarithmic equations |
| 11. ANS: B | OBJ: 7-5.1 To solve exponential and logarithmic equations |
| 12. ANS: A | OBJ: 7-5.1 To solve exponential and logarithmic equations |
| 13. ANS: A | OBJ: 7-5.1 To solve exponential and logarithmic equations |
| 14. ANS: A | OBJ: 7-5.1 To solve exponential and logarithmic equations |
| 15. ANS: B | OBJ: 7-5.1 To solve exponential and logarithmic equations |
| 16. ANS: A | OBJ: 7-6.1 To evaluate and simplify natural logarithmic expressions |
| 17. ANS: A | OBJ: 7-6.2 To solve equations using natural logarithms |
| 18. ANS: A | OBJ: 7-6.2 To solve equations using natural logarithms |
| 19. ANS: D | OBJ: 7-6.2 To solve equations using natural logarithms |
| 20. ANS: D | OBJ: 7-6.2 To solve equations using natural logarithms |