

Name: _____

Date: _____

Period: _____

Chapter 7 Review

Graph each equation on a separate piece of paper. Identify the domain, range, asymptote, and the y-intercept.

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

2. $y = 3^x$

3. $y = 2^x$

4. $y = 3^x - 1$

5. $y = \frac{1}{2}(4)^x - 3$

6. $y = -(2)^{x-2} + 2$

Without graphing, determine whether each equation represents exponential growth or decay. Then, find the y-intercept.

7. $y = 2\left(\frac{9}{10}\right)^x$

decay
(0, 2)

8. $y = 4.1(0.72)^x$

decay
(0, 4.1)

9. $y = 9.2(2.3)^x$

growth
(0, 9.2)

10. Mr. Anderson puts \$1000 into an account that earns 4.5% annual interest. How much money will be in the account at the end of 30 years?

$$A = 1000(1 + 0.045)^{30} = \$3745.32$$

11. A manufacturer bought a new rolling press for \$48000. It has depreciated in value at an annual rate of 15%. What is its value 5 years after the purchase?

$$A = 48000(1 - 0.15)^5 = \$21297.86$$

12. You place \$900 in an investment account that earns 6% interest compounded continuously. Find the value after 5 years.

$$A = 900 \cdot e^{(0.06)(5)} = \$1214.87$$

13. Bran invested \$10000 in an account that earns simple 5% interest annually.

a. How much interest does the account earn in the first 10 years?

$$10000(1 + 0.05)^{10} = \$16288.95$$

b. How much more would the account earn in interest in the first 10 years if the interest was compounded continuously?

$$10000 e^{(0.05)(10)} = \$16487.21$$

\$198.26
more

14. Kyle invests \$500 into an account that earns 0.25% interest compounded continuously.

a. Find the account balance after 5 years.

$$500e^{(0.0025)(5)} = \$506.29$$

b. When will Kyle's account balance be \$7482?

$$7482 = 500e^{(0.0025)t}$$

$$\frac{7482}{500} = e^{(0.0025)t}$$

$$14.964 = e^{(0.0025)t}$$

$$\ln 14.964 = \ln e^{(0.0025)t}$$

$$2.706 = 0.0025t$$

$$t = 1082 \text{ years}$$

Write each equation in logarithmic form.

15. $625^{\frac{1}{4}} = 5$

$$\log_{625} 5 = \frac{1}{4}$$

16. $2^{-5} = \frac{1}{32}$

$$\log_2 \frac{1}{32} = -5$$

17. $6^2 = 36$

$$\log_6 36 = 2$$

Write each in exponential form.

18. $\log_2 32 = 5$

$$2^5 = 32$$

19. $\log 0.01 = -2$

$$10^{-2} = 0.01$$

20. $\log_{\frac{1}{2}} \frac{1}{8} = 3$

$$\left(\frac{1}{2}\right)^3 = \frac{1}{8}$$

Evaluate each logarithm.

21. $\log 1000$

$$10^x = 1000$$

$$x = 3$$

22. $\log_4 256$

$$4^x = 256$$

$$x = 4$$

23. $\log_{27} 9$

$$27^x = 9$$

$$3^{3x} = 3^2$$

$$3x = 2 \quad x = \frac{2}{3}$$

24. $\log_{\frac{1}{3}} \frac{1}{27}$

$$\left(\frac{1}{3}\right)^x = \frac{1}{27}$$

$$x = 3$$

25. $\log_{125} 625$

$$125^x = 625$$

$$5^{3x} = 5^4$$

$$3x = 4 \quad x = \frac{4}{3}$$

26. $\log_8 \frac{1}{64}$

$$8^x = \frac{1}{64}$$

$$x = -2$$

Graph each logarithmic function. Identify the domain, range, asymptote, and the x-intercept.

27. $y = \log x + 2$

28. $y = \log_{\frac{1}{2}}(x - 1) + 5$

29. $y = \log_4(x + 1)$

Write each expression as a single logarithm.

30. $\log 8 + \log 3$

$$\log 24$$

31. $4(\log_2 x + \log_2 3)$

$$4(\log_2 3x)$$

$$\log_2 (3x)^4$$

32. $3 \log x + 4 \log x$

$$\log x^3 + \log x^4$$

$$\log x^7$$

33. $\log 4 + \log 2 - \log 5$

$$\log 8 - \log 5$$

$$\log \frac{8}{5}$$

Expand each logarithm.

34. $\log_2 2x^2y^3$
 $\log_2 2 + \log_2 x^2 + \log_2 y^3$
 $1 + 2\log_2 x + 3\log_2 y$

35. $\log_3 3m^3p^2$
 $\log_3 3 + \log_3 m^3 + \log_3 p^2$
 $1 + 3\log_3 m + 2\log_3 p$

36. $\log_8 (4mn)^5$
 $\log_8 4^5 m^5 n^5$
 $\log_8 1024 + \log_8 m^5 + \log_8 n^5$
 $\log_8 1024 + 5\log_8 m + 5\log_8 n$

37. $\log_{\frac{x^2}{2y}} \log x^2 - \log 2y$
 $2\log x - (\log 2 + \log y)$

38. $\log_{\frac{(xy)^4}{2}} \log \frac{x^4 y^4}{2}$
 $\log x^4 y^4 - \log 2$
 $\log x^4 + \log y^4 - \log 2$
 $4\log x + 4\log y - \log 2$

39. $\log_{10} \sqrt{xy^3}$ $\log_{10} x^{1/2} y^{3/2}$
 $\log_{10} 10 + \log x^{1/2} + \log y^{3/2}$
 $1 + \frac{1}{2}\log x + \frac{3}{2}\log y$

Solve each equation.

40. $\ln 2 + \ln x = 4$
 $\ln 2x = 4$
 $e^4 = 2x$
 $\frac{e^4}{2} = x$
 $x = 27.299$

41. $2 - 4^x = -62$
 $-4^x = -64$
 $4^x = 64$
 $4^x = 4^3$
 $x = 3$

42. $\log x + \log 2 = 5$
 $\log 2x = 5$
 $10^5 = 2x$
 $100000 = 2x$
 $50000 = x$

43. $\log_3 (x+1) = 4$
 $3^4 = x+1$
 $81 = x+1$
 $80 = x$

44. $e^{3x} = 20$
 $\ln e^{3x} = \ln 20$
 $3x \cdot \ln e = \ln 20$
 $3x = \ln 20$
 $x = \frac{\ln 20}{3}$
 $x = 0.999$

45. $e^{\frac{x}{4}} = 5$
 $\ln e^{x/4} = \ln 5$
 $\frac{x}{4} \ln e = \ln 5$
 $\frac{x}{4} = \ln 5$
 $x = 4 \ln 5$
 $x = 6.438$

46. $\ln x - \ln 4 = 7$
 $\ln \frac{x}{4} = 7$
 $e^7 = \frac{x}{4}$
 $4e^7 = x$
 $x = 4386.533$

47. $\log 4x = -1$
 $10^{-1} = 4x$
 $.1 = 4x$
 $.025 = x$

48. $\log 4 - \log x = -2$
 $\log \frac{4}{x} = -2$
 $10^{-2} = \frac{4}{x}$
 $.01 = \frac{4}{x}$
 $.01x = 4$
 $x = 400$

Simplify each expression.

49. $\frac{\ln e}{3 \ln e^3} \cdot \frac{1}{9 \ln e} = \frac{1}{9}$

50. $2 \ln e^{-5}$
 $-10 \ln e$
 -10

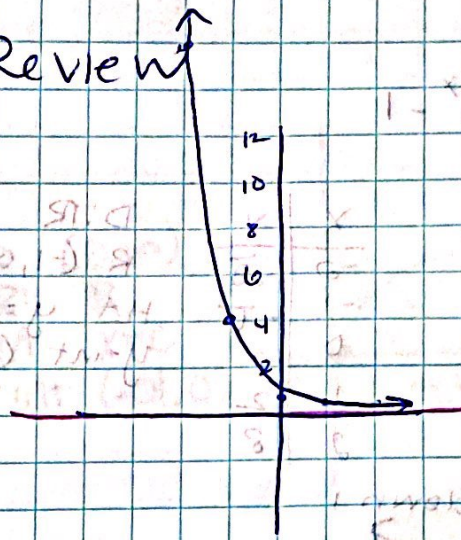
51. $\frac{3 \ln e^4}{2 \ln e^6} \cdot \frac{12 \ln e}{12 \ln e}$
 1

Chapter 7 Review

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

X	Y
-2	16
-1	4
0	1
1	.25
2	.06

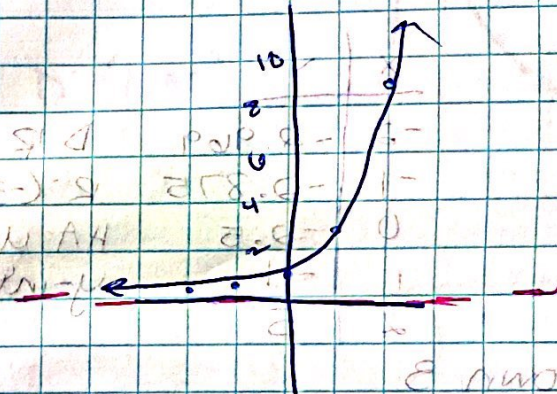
D: \mathbb{R}
 R: $(0, \infty)$
 HA: $y = 0$
 y-int: $(0, 1)$



2. $y = 3^x$

X	Y
-2	.11
-1	.33
0	1
1	3
2	9

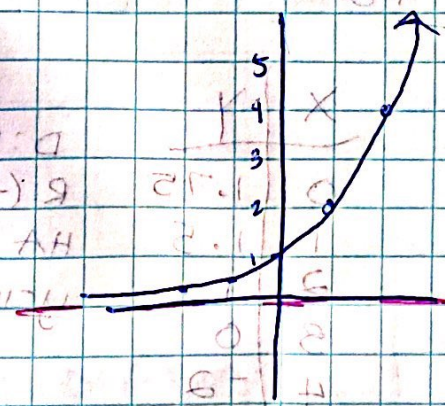
D: \mathbb{R}
 R: $(0, \infty)$
 HA: $y = 0$
 y-int: $(0, 1)$



3. $y = 2^x$

X	Y
-2	.25
-1	.5
0	1
1	2
2	4

D: \mathbb{R}
 R: $(0, \infty)$
 HA: $y = 0$
 y-int: $(0, 1)$



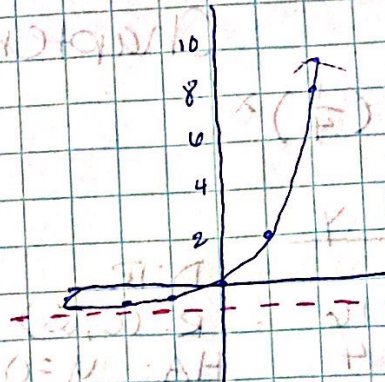
4. $y = 3^x - 1$

X	3^x
-2	.11
-1	.33
0	1
1	3
2	9

X	Y
-2	-.81
-1	-.67
0	0
1	2
2	8

D: \mathbb{R}
 R: $(-1, \infty)$
 HA: $y = -1$
 y-int: $(0, 0)$

down 1



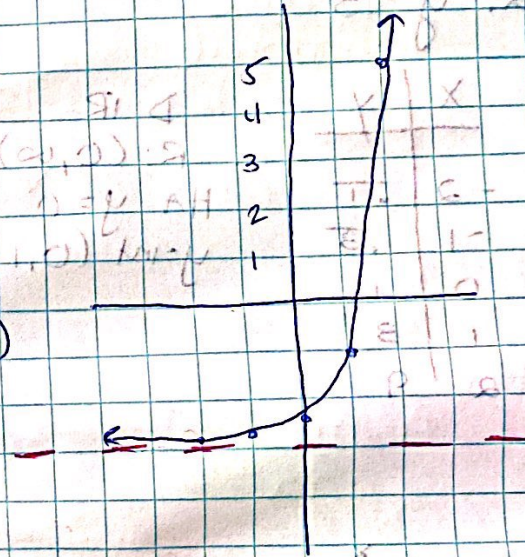
5. $\frac{1}{2}(4)^x - 3$

X	$\frac{1}{2}(4)^x$
-2	.031
-1	.125
0	.5
1	2
2	8

X	Y
-2	-2.969
-1	-2.875
0	-2.5
1	-1
2	5

D: \mathbb{R}
 R: $(-3, \infty)$
 HA: $y = -3$
 y-int: $(0, -2.5)$

down 3



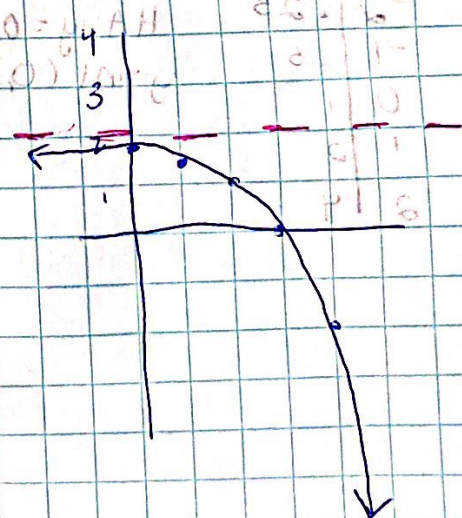
6. $-(2)^{x-2} + 2$

X	$-(2)^{x-2}$
-2	-.25
-1	-.5
0	-1
1	-2
2	-4

X	Y
0	1.75
1	1.5
2	1
3	0
4	-2

D: \mathbb{R}
 R: $(-\infty, 2)$
 HA: $y = 2$
 y-int: $(0, 1.75)$

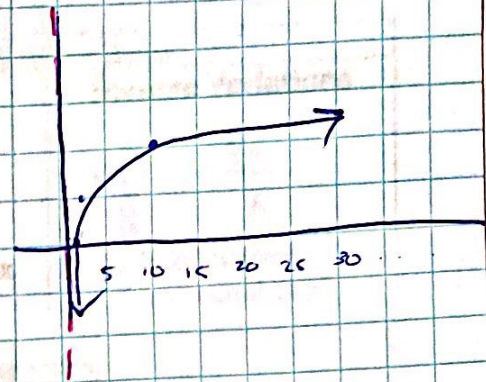
right 2
 up 2



27. $y = \log x + 2$

X	10^x	X	$\log x$	X	Y
-2	.01	.01	-2	.01	0
-1	.1	.1	-1	.1	1
0	1	1	0	1	2
1	10	10	1	10	3
2	100	100	2	100	4

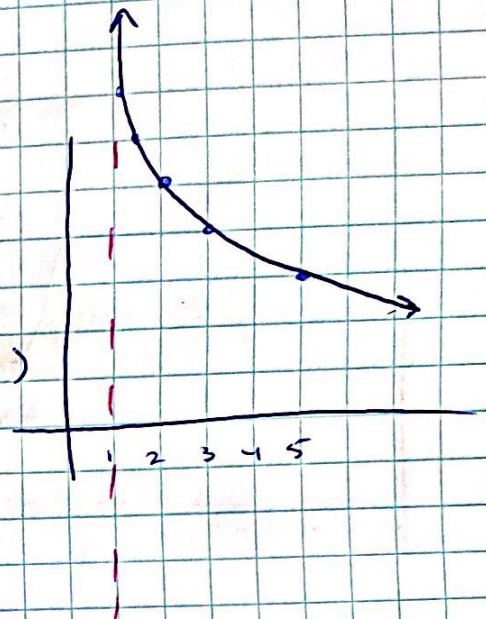
D: $(0, \infty)$
 R: \mathbb{R}
 VA: $x=0$
 X-int: $(.01, 0)$



28. $y = \log_{1/2}(x-1) + 5$

X	$(\frac{1}{2})^x$	X	$\log_{1/2} x$	X	Y
-2	4	4	-2	5	3
-1	2	2	-1	3	4
0	1	1	0	2	5
1	.5	.5	1	1.5	6
2	.25	.25	2	1.25	7

D: $(1, \infty)$
 R: \mathbb{R}
 VA: $x=1$
 X-int: $(33, 0)$



right 1
 up 5

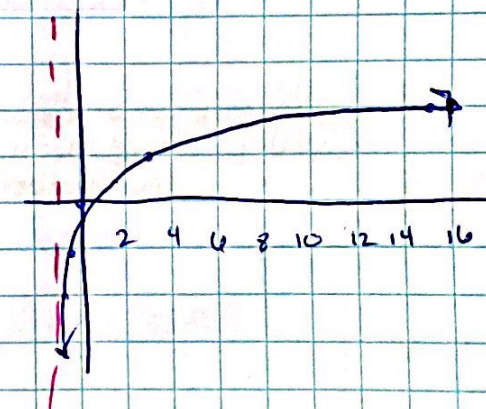
$0 = \log_{1/2}(x-1) + 5$

$\log_{1/2}(x-1) = -5$ $(\frac{1}{2})^{-5} = x-1$
 $x = 33$

29. $y = \log_4(x+1)$

X	4^x	X	$\log_4 x$	X	Y
-2	.06	.06	-2	-.94	-2
-1	.25	.25	-1	-.75	-1
0	1	1	0	0	0
1	4	4	1	3	1
2	16	16	2	15	2

D: $(-1, \infty)$
 R: \mathbb{R}
 VA: $x=-1$
 X-int: $(0, 0)$



left 1