

Unit 5 Review

**Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.**

$$1) \left( \frac{m^{\frac{7}{4}} n^{-1} p^2 \cdot pm^2 n^{\frac{1}{2}}}{n^{\frac{4}{3}}} \right)^2$$

$$\frac{p^6 n^{\frac{1}{3}} m^{\frac{15}{2}}}{n^4}$$

$$2) \frac{\left( x^{-\frac{5}{4}} y^{\frac{1}{3}} z^{-\frac{3}{2}} \right)^{-\frac{3}{2}}}{x^{\frac{1}{2}} y^{\frac{1}{2}} z^{\frac{1}{2}} \cdot y^{-\frac{1}{4}} z^{\frac{7}{4}}}$$

$$\frac{y^{\frac{3}{4}} x^{\frac{11}{8}}}{y^3}$$

$$3) \left( \frac{x^{-2} z^{-\frac{5}{4}}}{x^{\frac{7}{4}} y^2 \cdot x^{-1} y^{\frac{3}{2}}} \right)^{-\frac{7}{4}}$$

$$y^{\frac{49}{8}} z^{\frac{35}{16}} x^{\frac{77}{16}}$$

$$4) \frac{zx^2 \cdot x^2 \cdot yx^{\frac{2}{3}} z^2}{\left( x^{-\frac{1}{2}} y^4 z^2 \right)^{-2}}$$

$$y^9 z^7 x^{\frac{11}{3}}$$

**Write each expression in exponential form.**

$$5) (\sqrt[3]{7k})^4$$

$$(7k)^{\frac{4}{3}}$$

$$6) \frac{1}{(\sqrt[6]{2a})^7}$$

$$(2a)^{-\frac{7}{6}}$$

**Write each expression in radical form.**

$$7) (3p)^{\frac{5}{2}}$$

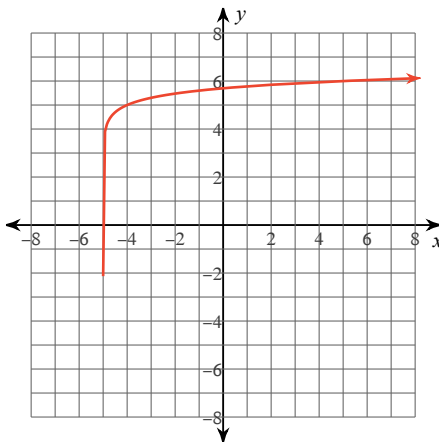
$$(\sqrt{3p})^5$$

$$8) (6n)^{\frac{2}{3}}$$

$$(\sqrt[3]{6n})^2$$

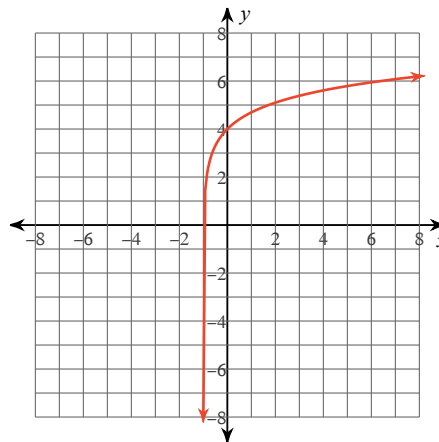
Create an  $x$ - $y$  table to sketch the graph of the function. Then identify the domain and range of each.

9)  $y = \log(x + 5) + 5$



Domain:  $x > -5$   
Range: All reals

10)  $y = \ln(x + 1) + 4$



Domain:  $x > -1$   
Range: All reals

Find the total value of the investment after the time given.

- 11) Use the compound interest formula,  $A = P\left(1 + \frac{r}{n}\right)^{nt}$ , to find the total amount if \$25,700 is invested at an interest rate of 4% and compounded daily for 5 years.

\$31,389.71

- 12) Use the continuous compounding formula,  $A = Pe^{rt}$  to find the total amount if \$13,800 is invested at an interest rate of 6.6% and compounded continuously for 2 years.

\$15,747.29

**Rewrite each equation in exponential form.**

$$13) \log_x 15 = -\frac{1}{2}$$

$$x^{-\frac{1}{2}} = 15$$

$$14) \log_9 x = -2$$

$$9^{-2} = x$$

$$15) \log n = 20$$

$$10^{20} = n$$

$$16) \ln y = x$$

$$e^x = y$$

**Rewrite each equation in logarithmic form.**

$$17) v^u = 107$$

$$\log_v 107 = u$$

$$18) y^4 = x$$

$$\log_y x = 4$$

$$19) 10^n = 107$$

$$\log 107 = n$$

$$20) e^u = v$$

$$\ln v = u$$

**Use a calculator to approximate each to the nearest thousandth.**

$$21) \log 38$$

$$1.58$$

$$22) \ln 5.5$$

$$1.705$$

$$23) \log_5 3.95$$

$$0.854$$

$$24) \log_6 2.9$$

$$0.594$$

**Expand each logarithm.**

$$25) \log_9 x^3$$

$$3 \log_9 x$$

$$26) \log_5 (x \cdot y)$$

$$\log_5 x + \log_5 y$$

$$27) \log_5 \frac{x}{y}$$

$$\log_5 x - \log_5 y$$

$$28) \log_3 (a \cdot b)^2$$

$$2 \log_3 a + 2 \log_3 b$$

$$29) \log_8 \frac{x^6}{y}$$

$$6 \log_8 x - \log_8 y$$

$$30) \log_6 (ab^5)$$

$$\log_6 a + 5 \log_6 b$$

$$31) \log_8 (uv^5 \cdot w)^5$$

$$5 \log_8 u + 25 \log_8 v + 5 \log_8 w$$

$$32) \log_7 \frac{zx^6}{y^2}$$

$$\log_7 z + 6 \log_7 x - 2 \log_7 y$$

$$33) \log_2 \left( \frac{x^4}{y \cdot z} \right)^3$$

$$12 \log_2 x - 3 \log_2 y - 3 \log_2 z$$

Condense each expression to a single logarithm.

34)  $5 \log_4 u$

$$\log_4 u^5$$

35)  $\log_6 a - \log_6 b$

$$\log_6 \frac{a}{b}$$

36)  $\log_3 a + \log_3 b$

$$\log_3 ba$$

37)  $4 \log_4 u + 4 \log_4 v$

$$\log_4 (v^4 u^4)$$

38)  $\log_5 x - 5 \log_5 y$

$$\log_5 \frac{x}{y^5}$$

39)  $5 \log_5 a + 5 \log_5 b$

$$\log_5 (b^5 a^5)$$

40)  $3 \log_2 w + 3 \log_2 u + 12 \log_2 v$

$$\log_2 (w^3 v^{12} u^3)$$

41)  $4 \ln u + 8 \ln v + 4 \ln w$

$$\ln (w^4 v^8 u^4)$$

42)  $3 \ln a - \ln c - 6 \ln b$

$$\ln \frac{a^3}{cb^6}$$

Solve each equation.

$$43) -8 \cdot 10^p = -99$$

1.0925

$$44) 3 \cdot 11^{p+1} = 41$$

0.0905

$$45) -8e^{8-8m} = -94.8$$

0.691

$$46) 18^{v-4} = 2$$

4.2398

$$47) 16^{r+2} + 2 = 75$$

-0.4525

$$48) 6 \cdot 10^{4k} - 10 = 61$$

0.2683

$$49) 10 \log_9 x = 30$$

{729}

$$50) -3 + \ln(x+2) = 0$$

{18.0855}

$$51) 10 + \log_6(-7k-7) = 14$$

{-186.1429}

$$52) \log_5(a-3) = 2$$

{28}

$$53) -7 \ln 2v = -28$$

$$\{27.2991\}$$

$$54) 5 \log_7 4v - 3 = -13$$

$$\{0.0051\}$$

$$55) \log(4x + 3) = \log 5x$$

$$\{3\}$$

$$56) \ln x + \ln 6 = 3$$

$$\{3.3476\}$$

$$57) \ln(x + 5) - \ln x = 2$$

$$\{0.7826\}$$

$$58) \log_6(x + 2) + \log_6 10 = 2$$

$$\{1.6\}$$

$$59) \ln 6 + \ln(3x - 3) = 4$$

$$\{4.0332\}$$

$$60) \ln 9 - \ln(3 - 4x) = 5$$

$$\{0.7348\}$$