

Unit 5 Pg 25

(1)  $\log_4 64 = 3$

(2)  $5^3 = 125$

(3)  $\log_2 \sqrt{m}$

$\log_2 \sqrt{m} - \log_2 \sqrt{n}$

$\frac{1}{2} \log_2 m - \frac{1}{2} \log_2 n$

(4)  $\ln \frac{x^2}{3y}$

$\ln x^2 - (\ln 3y)$   
 $2 \ln x - (\ln 3 + \ln y)$

(5)  $\frac{1}{2} \log_2 x - 2 \log_2 4 + \log_2 12y + \log_2 w$

$\log_2 \frac{\sqrt{x}(12yw)}{4^2}$

$\log_2 \frac{12wy\sqrt{x}}{16}$

(6)  $\frac{4x}{4} = \frac{\ln 9.4}{4}$

x =

(7)  $.462 = \ln x$

$e^{.462} = x$

x =

(8)  $\frac{1.32x}{1.32} = \frac{5.8}{1.32}$

x =

(9)  $.12x \log 10 = 5.3$

$\frac{.12x}{.12} = \frac{5.3}{.12}$

$x = \frac{5.3}{.12}$

x =

(10)  $x = \log_5 84.3$

x =

(11)  $x = 3.2$

(12)  $625 = e^{.58x}$

$\frac{.58x}{.58} = \frac{\ln 625}{.58}$

x =

(13)  $\frac{2.48}{3} = e^{.3x}$

$.81 = e^{.3x}$

$\frac{\ln .81}{.3} = \frac{.3x}{.3}$

$x = \frac{\ln .81}{.3}$

x =

(14)  $e^{-6.5} = x$

x =

(15)  $x = \log_{9.6} 12.4$

x =

(16)  $\frac{1}{3^x} = 12$

$\frac{1}{12} = \frac{12 \cdot 3^x}{12}$

$3^x = \frac{1}{12}$

$x = \log_3 \frac{1}{12}$

x =

(17)  $12.4 = x^{9.6}$

$(12.4)^{\frac{1}{9.6}} = x$

x = 1.3

(18)  $1600 = 750(1 + \frac{.08}{12})^{12t}$

$\frac{1600}{750} = (1 + \frac{.08}{12})^{12t}$

$\log_{1 + \frac{.08}{12}} \frac{1600}{750} = 12t$

$t = \frac{1}{12} \log_{1 + \frac{.08}{12}} \frac{1600}{750}$

t = 9.5

(19)  $\frac{500000}{105000} = \frac{105000(1 + .12)^t}{105000}$

$\frac{100}{21} = 1.12^t$

$t = \log_{1.12} \frac{100}{21}$

t = 13.8

Unit 5 Pg 25 continued

$$(19) A = Pe^{rt}$$

$$200 = 50e^{.08t}$$

$$4 = e^{.08t}$$

$$\ln_e 4 = .08t$$

$$t = \frac{\ln_e 4}{.08}$$

$$t = 17.3$$

$$(20) y = a \cdot b^x$$

$$185 = 40 \cdot b^{3.5}$$

$$\frac{185}{40} = b^{3.5}$$

$$b = \left(\frac{185}{40}\right)^{\frac{1}{3.5}}$$

$$b = 3$$

$$(21) 5000 = 8500(1 - .09)^t$$

$$\frac{5000}{8500} = (1 - .09)^t$$

$$t = \log_{(1-.09)} \frac{5000}{8500}$$

$$t = 5.6$$

$$(22) 1.52$$

$$(23) .75$$

$$(24) 1.77$$

$$(25) x^{\frac{1}{2}} = \sqrt{6}$$

$$x = 6$$

$$(26) 8^x = 2^7 \cdot 4^9$$

$$(2^3)^x = 2^7 \cdot (2^2)^9$$

$$2^{3x} = 2^{25}$$

$$3x = 25$$

$$x = \frac{25}{3}$$

$$(27) \left(\frac{3}{3}\right)^{1-x} = \left(\frac{-2}{3}\right)^{2-x}$$

$$3 - 3x = -4 + 2x$$

$$7 = 5x$$

$$x = \frac{7}{5}$$

$$(28) (2^3)^{x-1} = 2^{x+1}$$

$$3x - 3 = x + 1$$

$$2x = 4$$

$$x = 2$$

$$(29) 9^{4x} = 9^2$$

$$4x = 2$$

$$x = \frac{1}{2}$$

$$(30) \log_9 7 \cdot 4^{\frac{1}{2}} = \log_9 x$$

$$x = 14$$

$$(31) \log_2(x(x-2)) = 3$$

$$2^3 = x^2 - 2x$$

$$0 = x^2 - 2x - 8$$

$$0 = (x-4)(x+2)$$

$$x = 4$$

$$(32) \log_2(x^2+8) = \log_2 6x$$

$$x^2 + 8 = 6x$$

$$x^2 - 6x + 8 = 0$$

$$(x-4)(x-2) = 0$$

$$x = 4 \quad x = 2$$

$$(33) \log_6 x^2 + x = 1$$

$$6^1 = x^2 + x$$

$$x^2 + x - 6 = 0$$

$$(x+3)(x-2) = 0$$

$$x = -3 \quad x = 2$$

$$(34) \log_2 \frac{x^2}{x+3} = 2$$

$$2^2 = \frac{x^2}{x+3}$$

$$4x + 12 = x^2$$

$$x^2 - 4x - 12 = 0$$

$$(x-6)(x+2) = 0$$

$$x = 6 \quad x = -2$$

$$(35) \log_4(2x+1) - \log_4(x-2) = 1$$

$$\log_4 \frac{2x+1}{x-2} = 1$$

$$4^1 = \frac{2x+1}{x-2}$$

$$4x - 8 = 2x + 1$$

$$2x = 9$$

$$x = \frac{9}{2}$$

Unit 5 pages continued

(36)  $x^{-1} = \frac{1}{2}$

$x = 2$

(37)  $3^2 = x - 4$   
 $+4 \quad +4$

$x = 13$

(38)  $\sqrt{3}^4 = x$

$9 = x$

(39) ~~1~~  $\frac{1}{3}$

(40) 3

(41) 0

(42)  $8 \log_8 \frac{27}{5}$

$\frac{27}{5}$

(43) 7

(44) 16

(45)  $\log_6 36$

2

(46) 7

(47)  $\log_4 (\log_2 4)$

$\log_4 2$

$\frac{1}{2}$

(48)  $\log_6 6^{\frac{1}{2}}$

$\log_6 6^{\frac{3}{2}}$

$\frac{3}{2}$