

# Unit 4 Review - Part 1

① Exp Decay  $1-r = \frac{3}{5}$  Dec 40%

$$-r = -\frac{2}{5}$$

$$r = \frac{2}{5}$$

$$r = .4$$

② Exp Growth  $1+r = 1.05$  5% Increase

$$r = .05$$

③  $y = a(1+r)^x$

$$y = 380(1+.08)^x$$

$$y = 380(1.08)^{10}$$

$\$820.39$

④  $y = a(1-r)^x$

$$y = 19,000(1-.14)^t$$

$$y = 19,000(.86)^t$$

$$9500 = 19,000(.86)^t$$

$$\log .5 = \log .86^t$$

$$\frac{\log .5}{\log .86} = \frac{t \log .86}{\log .86}$$

Use Calc.

$$y_1 = 9500$$

$$y_2 = 19,000(.86)^t$$

$$4.596 = t$$

$4.6 \text{ yrs}$

⑤  $8^{1/3} = 2$

⑥  $e^x = 7$

⑦  $\log_4 8 = \frac{3}{2}$

⑧  $\ln 2y = 5$

⑨ 1

⑩ 1

⑪ 5

⑫ 0

⑬ 5

$$\textcircled{14} \log_2 x + \log_2 9 = \log_2 18$$

$$\log_2 9x = \log_2 18$$

$$9x = 18$$

$$\boxed{x = 2}$$

$$\textcircled{15} 2\log_b 8 + \log_b y - 2\log_b 2 = \log_b 4$$

$$\log_b 8^2 + \log_b y - \log_b 2^2 = \log_b 4$$

$$\log_b (64y) - \log_b 4 = \log_b 4$$

$$\log_b \left( \frac{64y}{4} \right) = \log_b 4$$

$$\log_b (16y) = \log_b (4)$$

$$16y = 4$$

$$\boxed{y = \frac{1}{4}}$$

$$\textcircled{16} \log_4 x = 3$$

$$4^3 = x$$

$$\boxed{64 = x}$$

$$\textcircled{17} 2^x = 53$$

$$\text{Log } 2^x = \text{Log } 53$$

$$x \text{Log } 2 = \text{Log } 53$$

$$x = \frac{\text{Log } 53}{\text{Log } 2}$$

$$\boxed{x = 5.728}$$

$$\textcircled{18} \ln(x+3) = 2$$

$$e^2 = x+3$$

$$e^2 - 3 = x$$

$$\boxed{x = 4.389}$$

$$\textcircled{19} \log_6 x + \log_6 (x-5) = 2$$

$$\log_6 (x^2 - 5x) = 2$$

$$6^2 = x^2 - 5x$$

$$0 = x^2 - 5x - 36$$

$$0 = (x-9)(x+4)$$

$$x = 9 \quad \cancel{x = -4}$$

$$\{9, -4\}$$

$$\textcircled{20} e^{3x} = 124$$

$$\ln e^{3x} = \ln 124$$

$$3x \ln e = \ln 124$$

$$\frac{3x \ln e}{3} = \frac{\ln 124}{3}$$

$$x = 1.607$$

$$\textcircled{21} 4^{3x} + 2 = 3$$

$$\log 4^{3x} = \log 1$$

$$3x \log 4 = \log 1$$

$$3x = \frac{\log 1}{\log 4}$$

$$3x = 0$$
$$x = 0$$

$$\textcircled{22} 2^{3x} = 16^{2x-1}$$

$$2^{3x} = (2^4)^{2x-1}$$

$$2^{3x} = 2^{8x-4}$$

$$3x = 8x - 4$$

$$-5x = -4$$

$$x = \frac{4}{5}$$

$$\textcircled{23} \quad 5 - e^{x-1} = 2$$

$$\frac{-e^{x-1}}{-1} = \frac{-3}{-1}$$

$$e^{x-1} = 3$$

$$\ln e^{x-1} = \ln 3$$

$$(x-1) \ln e = \ln 3$$

$$(x-1) (1) = \ln 3$$

$$x-1 = \ln 3$$

$$x = \ln 3 + 1$$

$$\boxed{x = 2.699}$$

$\textcircled{24}$

$$a. \quad A = P \left(1 + \frac{r}{n}\right)^{nt}$$

$$A = 1000 \left(1 + \frac{.085}{4}\right)^{4(5)}$$

$$\boxed{A = \$1522.79}$$

$$b. \quad 2000 = 1000 \left(1 + \frac{.085}{4}\right)^{4t}$$

$$2 = (1.02125)^{4t}$$

$$\log 2 = \log (1.02125)^{4t}$$

$$\log 2 = 4t \log 1.02125$$

$$\log 1.02125 \quad \log 1.02125$$

$$32.9640 = 4t$$

$$\boxed{8.241 = t} \quad 8.24 \text{ yrs.}$$

$$c. \quad 5000 = 1000 \left(1 + \frac{.085}{4}\right)^{4t}$$

$$\log 5 = \log (1.02125)^{4t}$$

$$\boxed{t = 19.135}$$

$$\boxed{19.135 \text{ yrs}}$$

25  $A = Pert$   
 $A = 3000e^{.04(12)}$   
 $A = \$4848.22$

b.  $6000 = 3000e^{.04(t)}$

$2 = e^{.04t}$

$\ln 2 = \ln e^{.04t}$

$\ln 2 = .04t \ln e$

$17.33_{\text{yrs}} = t$

26  $y = 3x - 4$   
 $x = 3y - 4$

$\frac{x+4}{3} = \frac{3y}{3}$

$\frac{x+4}{3} = y$

$f^{-1}(x) = \frac{x+4}{3}$

27.  $f(x) = 2x + 1$   
 $g(x) = x^2 - 3$

$g \circ f(x)$

$g[f(x)]$

$g(2x+1)$

$(2x+1)^2 - 3$

$4x^2 + 4x + 1 - 3$

$4x^2 + 4x - 2$

28 Solve  $x^2 - 4x - 8 = 0$   
 $x^2 - 4x + 4 = 8 + 4$

$\sqrt{(x-2)^2} = \sqrt{12}$

$x-2 = \pm 2\sqrt{3}$

$x = 2 \pm 2\sqrt{3}$

29  $2|x-3| > 10$

$|x-3| > 5$

$x-3 > 5$  OR  $-x+3 > 5$

$x > 8$

OR  $\frac{-x > 2}{x < -2}$

$(x+4)(x-4)$

