

Name: _____

QUIZ 2
September 4, 2001

Calculators are allowed — but you must show your work to receive full credit!

1. Evaluate each logarithm below, using the properties of logarithmic functions and the following facts

$$\log_a x = 4 \quad \log_a y = 2 \quad \log_a z = 3.$$

(a) $\log_a(xz)$

(b) $\log_a(\sqrt{y})$

(c) $\log_a(x^4)$

2. The purchasing power P (in dollars) of an annual amount of A dollars after t years of 5% inflation is given by

$$P = Ae^{-0.05t}.$$

How long will it be before a pension of \$30,000 per year has a purchasing power of \$8,000?

Solutions to Quiz #1

$$1(a) \log_a(xy) = \log_a(x) + \log_a(y) = 4 + 2 = 6.$$

$$1(b) \log_a(\sqrt{y}) = \log_a(y^{1/2}) = (1/2) \log_a(y) = (1/2) \cdot 2 = 1.$$

$$1(c) \log_a(x^4) = 4 \log_a(x) = 4 \cdot 4 = 16.$$

2. Take the natural log of both sides of the equation to obtain

$$\ln(P) = \ln(Ae^{-0.05t}) = \ln(A) - \ln(e^{-0.05t}) = \ln(A) - 0.05t.$$

Now solve for t :

$$t = 20(\ln(A) - \ln(P)).$$

Plug in to get

$$t = 20(\ln(30000) - \ln(8000)) = 26.4 \text{ years.}$$