7-3

HW 8-3

Secondary III

Name: Selected Answers

Date: _____ Class: _____

Solve the following equations graphically. Find the intersection

1. $4e^{0.1x} = 60$

2. $120e^{2x} = 75e^{3x}$ (y_1 y_2)

Window:
xmin=0 ymin=250
xmax=1 ymax=350

$x = 0.47$

3. $5 = 625e^{0.02x}$

Solve the following equations algebraically

· get log alone or get exponent alone. Take inverse.

4. $\frac{7e^{3x}}{7} = \frac{42}{7}$

$\ln e^{3x} = \ln 6$

$\frac{3x}{3} = \frac{\ln(6)}{3} = 0.60$

5. $5^{2x} = 15$

6. $\log x^2 = 4$ (base 10)

$\sqrt{x^2} = \sqrt{10^4}$

$x = \sqrt{10000} = 100$

7. $\ln(x-3) = 4\ln 2$

8. $2^x - 6 = 10$

$+6 \quad +6$

$\log_2 2^x = \log_2 16$

$x = \log_2(16) = 4$

$x = 4$

9. $\log_4(x-5) = -1$

Price, initial price, rate of $

10. The price P of a gallon of gas after t years is given by the equation $P = P_0(1 + r)^t$ where P_0 is the initial price of gas and r is the rate of inflation. If the price of a gallon of gas is currently $3.25, how long will it take for the price to rise to $4.00 if the rate of inflation is 10.5%?

P = $4.00, P_0 = $3.25, r = 10.5% (change to decimal)

- get exponent alone
- take log

$4.00 = 3.25(1+.105)^t \Rightarrow \frac{4}{3.25} = \frac{3.25(1.105)^t}{3.25}$

$\log_{(1.105)} \frac{4}{3.25} = \log_{1.105}(1.105)^t$

$t = \log_{1.105}\left(\frac{4}{3.25}\right) =$ 2.1 years

11 Match the equations with the solutions.

a. $9e^{3x} = 27$ _____ $x \approx 1.099$

b. $9e^{x} = 27$ _____ ~~$x \approx 1.022$~~ $x \approx 0.341$

c. $9e^{3x-4} = 27$ _____ $x \approx 0.366$

d. $9e^{3x} + 2 = 27$ _____ $x \approx 1.700$

Hints:

a) $\frac{9e^{3x}}{9} = \frac{27}{9}$

$\ln(e)^{3x} = \ln(3)$

$3x = \ln(3)$

$x = \frac{\ln(3)}{3} =$

b) $\frac{9e^{x}}{9} = \frac{27}{9}$

$\ln(e)^{x} = \ln(3)$

$x = \ln(3) =$

c) $9e^{3x-4} = 27$

d) $9e^{3x} + 2 = 27$