

# AP Calculus Exam Prep Assignment #5 page 2

7)  $A = Pe^{rt}$   $40000 = Pe^{.08(35)} \Rightarrow P = \frac{40000}{e^{.08(35)}} = \$2432.41$  **C)**

8)

$$\frac{dy}{dt} = -0.11(y - 68) \Rightarrow \frac{dy}{y - 68} = -0.11dx \Rightarrow \int \frac{dy}{y - 68} = \int -0.11dx \Rightarrow \ln|y - 68| = -0.11x + C$$

$$\ln|180 - 68| = -0.11(0) + C \Rightarrow C = \ln 112 \quad y = e^{-0.11x + \ln 112} + 68 = 112e^{-0.11x} + 68$$

$$y(10) = 112e^{-1.1} + 68 \approx 105.28$$

**C)**

9)

$$\frac{dy}{dt} = ky \Rightarrow \frac{dy}{y} kdt \Rightarrow \int \frac{dy}{y} = \int kdt \Rightarrow \ln y = kt + C \quad \ln 40 = k(0) + C \Rightarrow C = \ln 40$$

$$y = e^{kt + \ln 40} = 40e^{kt} \quad 10 = 40e^{k(2)} \Rightarrow e^{2k} = \frac{1}{4} \Rightarrow 2k = \ln\left(\frac{1}{4}\right) \Rightarrow k = \frac{\ln(1/4)}{2} = \ln(4^{-1})^{1/2} = -\ln 2$$

**A)**

For problems 10-15, use the slope fields provided on the next page.

10) Which slope field is for the differential equation  $y' = y$ ? **C) III**

11) Which slope field is for the differential equation  $y' = \frac{-x}{y}$ ? **D) IV**

12) Which slope field is for the differential equation  $y' = \sin x$ ? **B) II**

13) Which slope field is for the differential equation  $y' = 2x$ ? **E) V**

14) Which slope field is for the differential equation  $y' = e^{-x^2}$ ? **A) I**

15) A particular solution curve of a differential equation whose slope field is shown in II passes through the point (0,-1). Its equation is:

$$\frac{dy}{dx} = \sin x \Rightarrow dy = \sin x dx \Rightarrow \int dy = \int \sin x dx \Rightarrow y = -\cos x + C$$

$$-1 = -\cos(0) + C \Rightarrow C = 0 \quad y = -\cos x$$

**D)**