CH.6 WS #1 Calculus BC

Name____ **Per.**____

1) A radioactive element loses 42% of its mass in 70 years.

a) What is its half-life?

b) How long will it take the element to lose 90% of its mass?

2) Population of West Covina in 1960 was 30,000 and in 2000 the population was 320,000.

a) What is the growth rate?

b) At this rate of growth, what year will the population reach 500,000?

3) Given $\frac{dy}{dx} = 2x(6-y)$ with initial condition $(0,-4)$.

a) Find the particular solution of the differential equation.

b) Use Euler's method with step size $h = 0.3$ to approximate $y(0.9)$.

c) Find $y(0.9)$.

4) A population of elk is represented by the logistic differential equation $\frac{dP}{dt} == P\left(\frac{1}{40} - \frac{P}{12000}\right)$

a) Find the value of k and the carrying capacity. $k =$ __________ $L =$ __________

b) The initial population is $P(0) = 50$ elk. Find a formula for the population in terms of t. $P(t) =$ ______________________

c) What is the elk population when the growth rate is at its maximum? $P =$ _____________

d) How long will it take for the elk population to reach 150? $t =$ _____________

e) What is the elk population after 9 years? $P =$ _____________

MC: 5) A conservation organization releases 50 foxes into a preserve. After 5 years, there are 85 foxes in the preserve. The preserve has a carrying capacity of 225. Write a logistic equation that models the population.

$a)\ \ y=\dfrac{225}{1+5e^{-0.300754t}}$ $b)\ \ y=\dfrac{225}{1+3.5e^{-0.350754t}}$

$c)\ \ y=\dfrac{225}{1+3.5e^{-0.150754t}}$ $d)\ \ y=\dfrac{225}{1+3.5e^{-0.950754t}}$

$e)\ \ y=\dfrac{225}{1+2.5e^{-0.650754t}}$

MC: 6) A conservation organization releases 40 coyotes into a preserve. After 4 years, there are 70 coyotes in the preserve. The preserve has a carrying capacity of 175. Determine the time it takes the population to reach 140.

a) 12.838 years *b*) 15.559 years *c*) 11.454 years *d*) 10.271 years *e*) 14.463 years

7) Given the differential equation $\dfrac{9}{x}\dfrac{dy}{dx}=\dfrac{8}{y}$.

a) Given $f(2)=-2$, use Euler's Method to approximate the particular solution of this differential equation at $x=2.6$. Use a step size of $h=0.2$.

b) Find the particular solution $y=f(x)$ to the given differential equation with the initial condition $f(2)=-2$.

c) Write the equation of the tangent line at $(2,-2)$ and use it to approximate $f(2.6)$.

d) Find $f(2.6)$.