* Unstapled, frills, messy −5pts

20

10pts

1) 3pts Blank 1) $P = P_0 e^{rt}$ 1pt

$= 450{,}000\, e^{.06(213)}$

$\approx \$1.5977 \times 10^{11}$

$\approx \$160$ billion 2pts

3pts Blank 2) $P = P_0(1+r)^t$ 1pt

$= 450{,}000(1+.06)^{213}$

$\approx \$1.105 \times 10^{11}$

$\approx \$110.5$ billion 2pts

4pts Blank 3) The principal is \$110.5 billion 1pt

The amount of interest earned in 1990 is

$110.5 \times 10^{11}(.06) = \$6.63 \times 10^9$ 1pt

Want Interest/second. Need # of seconds in a year:

$\left(365 \frac{\text{days}}{\text{year}}\right)\left(24 \frac{\text{hours}}{\text{day}}\right)\left(60 \frac{\text{mins}}{\text{hour}}\right)\left(60 \frac{\text{sec}}{\text{min}}\right)$

$= 31{,}536{,}000$ sec/year 1pt

Interest is accruing at

$\frac{\$6.63 \times 10^9}{31{,}536{,}000} \approx \$210.24/\text{sec}$ 1pt

10pts

2) T_r decays exponentially so

2pts $T_r = Ae^{rt}$ where r is negative

From the table we know

2pts $37 = Ae^{r(4)}$ and $13 = Ae^{r(19.5)}$

Need to find A (the amount at $t=0$) so first solve for r then plug in to solve for A.

$$\frac{13}{37} = \frac{Ae^{19.5r}}{Ae^{4r}}$$

$$\frac{13}{37} = e^{15.5r}$$

$$\ln(13/37) = 15.5r$$

$$r = \frac{\ln(13/37)}{15.5} \approx -.06748$$ 2pts

If people did a linear approx I gave 1pt for conclusion.

$$37 = Ae^{4\left(\frac{\ln(13/37)}{15.5}\right)}$$

$$A = \frac{37}{e^{4\left(\frac{\ln(13/37)}{15.5}\right)}} \approx 48.5 \text{ ng/ml}$$ 2pts

Since the peak is greater than 45 ng/ml, we CAN diagnose anaphylaxis.

2pts