QUIZ 15

11/30/18

2pts

1) A population $P(t)$ is growing at a rate proportional to its size. (i.e. $P'(t)$ is prop. to $P(t)$)
Initially, there are 2000 individuals.
After 3 days, there are 4000.
What is the growth rate? (round to 4 dec. places)

SOL

$$P(t) = 2000e^{kt} \qquad \text{Use } P(3) = 4000$$

$$4000 = 2000e^{k(3)}$$

$$2 = e^{3k} \Rightarrow \quad k = \frac{\ln 2}{3} \approx \boxed{0.2310}$$

2pts

2) Set up but do not compute an approximation for $\int_1^4 \sin(x^2)\,dx$ using 6 trapezoids.

$n=6, \quad \Delta x = \frac{4-1}{6} = \frac{1}{2}$

$x_0 = 1, \; x_1 = 1+\Delta x = 3/2$
$x_2 = 2, \; x_3 = 5/2, \; x_4 = 3$
$x_5 = 7/2, \; x_6 = 4$

$$T_6 = \frac{1}{2}\left(\frac{1}{2}\right)\Big[\sin(1) + 2\sin\left(\left(\tfrac{3}{2}\right)^2\right) + 2\sin(2^2) + 2\sin\left(\left(\tfrac{5}{2}\right)^2\right) + 2\sin(3^2) + 2\sin\left(\left(\tfrac{7}{2}\right)^2\right) + \sin(4^2)\Big]$$

3) Assorted answers ☺