Quiz 15 Solution

December 1, 2017

1. (2 points) Approximate $\int_0^2 f(x) dx$ using Trapezoid Rule and the following table: 2/34/320 x15 21 f(x)12-9

Solution: Based on the table, use 3 trapezoids with $\Delta x = 2/3$. So

$$\int_0^2 f(x) \, dx \approx \frac{1}{2} \Delta x [f(0) + 2f(2/3) + 2f(4/3) + f(2)]$$
$$= \frac{1}{2} \cdot \frac{2}{3} [15 + 2(12) + 2(-9) + 21]$$
$$= 14$$

Answer: 14

2. (2 points) P(t) measures the population of rabbits t years after January 1, 2018. Assume the growth rate of the population is proportional to the population. If the population on January 1, 2018 is 10 and the population on January 1, 2020 is 35, approximate the population on January 1, 2025. (Round to the nearest integer.) **Solution:** Since $\frac{dP}{dt} = kP$, we know that $P(t) = Ce^{kt}$. Since we're given the initial population is 10, C = 10. So $P(t) = 10e^{kt}$.

At t = 2 (January 1, 2020), P = 35. Plugging in and solving for k,

$$35 = 10e^{2k}$$
$$\frac{35}{10} = e^{2k}$$
$$\ln(3.5) = 2k$$
$$\frac{\ln(3.5)}{2} = k$$

So $P(7) = 10e^{\frac{\ln(3.5)}{2} \cdot 7} \approx 802$ **Answer:** 802

3. (1 point) What, if anything, would you change about this course? **Answer:** Answers will vary.