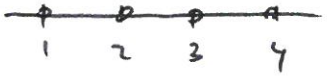
Math 1215: Quiz #7 **Winter 2018**

Name: SOLUTIONS	A#:	Section:

1. Use the trapezoid rule with $n = 3$ subintervals to estimate $\int_1^4 \sqrt{x}\,dx$.

$f(x) = \sqrt{x}$, $\Delta x = \frac{4-1}{3} = 1$



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$$\int_1^4 \sqrt{x}\,dx \approx \left(f(1) + 2f(2) + 2f(3) + f(4)\right)\frac{\Delta x}{2}$$

$$= \left(\sqrt{1} + 2\sqrt{2} + 2\sqrt{3} + \sqrt{4}\right)\cdot\frac{1}{2}$$

$$= \frac{3}{2} + \sqrt{2} + \sqrt{3}$$

2. A machine is installed today. After t years, it will be generating income at a rate of $10000e^{-t/10}$ dollars per year. Find the present value of the income generated by this machine over the next 5 years using a discount rate of 5%.

$5\% = 0.05 = \frac{1}{20}$

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$$P = \int_0^5 10000\,e^{-t/10}\cdot e^{-t/20}\,dt$$

$$= \int_0^5 10000\,e^{-3t/20}\,dt$$

$$= 10000\left(-\frac{20}{3}\right)e^{-3t/20}\Big|_0^5$$

$$= -\frac{200000}{3}\left(e^{-3/4} - 1\right)$$

$$= \frac{200000}{3}\left(1 - e^{-3/4}\right)$$

v7.1