

QUIZ 1 SOLUTIONS: LESSON R
JANUARY 10, 2018

Write legibly, clearly indicate the question you are answering, and put a box or circle around your final answer. If you do not clearly indicate the question numbers, I will take off points. Write as much work as you need to demonstrate to me that you understand the concepts involved. If you have any questions, raise your hand and I will come over to you.

1. [2 pts] Evaluate $\int 7 \sec(x)(\sec(x) + \tan(x)) dx$.

$$\int 7 \sec x (\sec x + \tan x) dx = 7 \int (\sec^2 x + \sec x \tan x) dx$$

$$= 7 \int \sec^2 x dx + 7 \int \sec x \tan x dx$$

$$\int \sec^2 x dx = \tan x + C$$

$$\int \sec x \tan x dx = \sec x + C$$

$$= \boxed{7 \tan x + 7 \sec x + C}$$

2. [3 pts] Evaluate $\int_0^{\pi/2} (2e^x + 7 \cos(x)) dx$.

$$\int_0^{\pi/2} (2e^x + 7 \cos x) dx = \int_0^{\pi/2} 2e^x dx + \int_0^{\pi/2} 7 \cos x dx$$

$$= 2e^x \Big|_0^{\pi/2} + 7 \sin x \Big|_0^{\pi/2}$$

$$= 2e^x + 7 \sin x \Big|_0^{\pi/2}$$

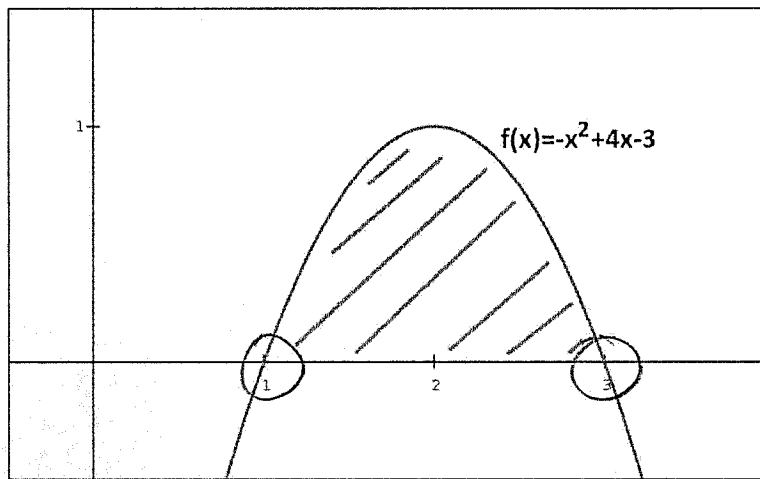
$$= 2e^{\pi/2} + 7 \sin \frac{\pi}{2} - \left[2e^0 + 7 \sin 0 \right]$$

$$= 2e^{\pi/2} + 7 - 2 = \boxed{2e^{\pi/2} + 5}$$

$$\int e^x dx = e^x + C$$

$$\int \cos x dx = \sin x + C$$

3. Consider the following region:



(a) [2 pts] Write down a definite integral that describes the region above.

$$\int_1^3 (-x^2 + 4x - 3) dx$$

(b) [3 pts] Compute the definite integral from part (a). Round your answer to the nearest hundredth.

$$\begin{aligned} \int_1^3 (-x^2 + 4x - 3) dx &= \left. -\frac{1}{2+1} x^{2+1} + \frac{4}{1+1} x^{1+1} - 3x \right|_1^3 \\ &= \left. -\frac{1}{3} x^3 + \frac{4}{2} x^2 - 3x \right|_1^3 \\ &= -\frac{1}{3}(3)^3 + 2(3)^2 - 3(3) - \left[-\frac{1}{3}(1)^3 + 2(1)^2 - 3(1) \right] \\ &= -\frac{1}{3}(27) + 2(9) - 9 + \frac{1}{3} - 2 + 3 \\ &= -9 + 18 - 9 + \frac{1}{3} - 2 + 3 \\ &= \frac{1}{3} + 1 \approx \boxed{1.33} \end{aligned}$$