Math 221 Sec 003 Quiz 7 Solutions

1. Find the most general antiderivative of the function

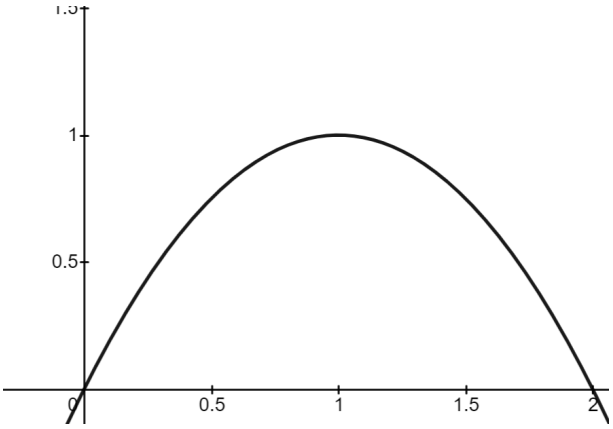
$$f(x) = \sec(x)\tan(x) - \frac{1}{x^2}.$$

Solution:

$$f(x) = \sec(x)\tan(x) - x^{-2} \qquad \text{(Change to } x^{-2} \text{ } +1)$$
$$F(x) = \sec(x) + x^{-1} + C \qquad (\sec(x) \text{ } +1)$$
$$(+x^{-1} \text{ } +1)$$
$$(\text{missing } +C \text{ } \text{-1})$$

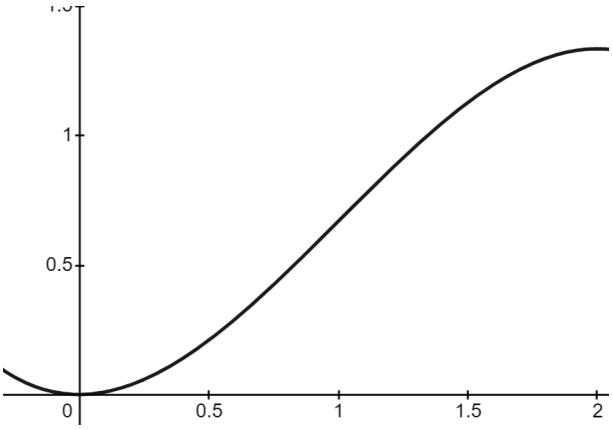
(Can get full mark without change to x^{-2})

2. Consider the following function $f(x)$.



Sketch the antiderivative $F(x)$ for $0 \leq x \leq 2$ with $F(0) = 0$.

Solution:

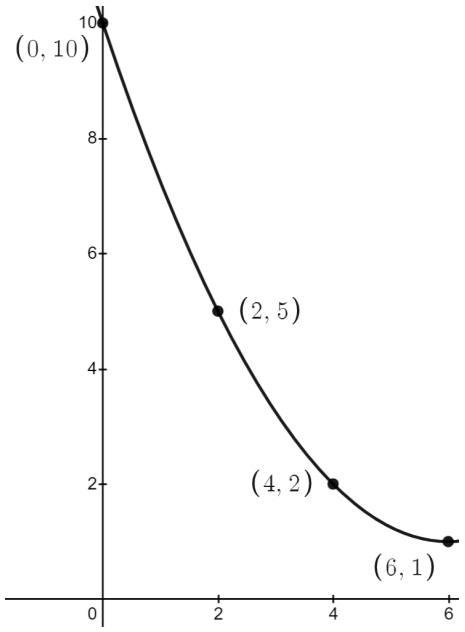


(Increasing function +1)

(Slope 0 at $x = 0, 2$ +1)

(Inflection at $x = 1$ +1)

3. Consider the following function $f(x)$.



(a) Use 3 rectangles of equal width, and right endpoints, to estimate the area under the graph for $0 \leq x \leq 6$.

(b) Is this an overestimate, or an underestimate?

Solution:

(a) The width of each rectangle is $6/3 = 2$.

(Correct width +1)

The sum of the areas of three rectangles is

$$R_3 = 2(5 + 2 + 1) \quad \text{(Correct setup +1; award even if left endpoint)}$$
$$= 16 \quad \text{(Correct answer +1; no error carried forward)}$$

(b) Underestimate

(Correct answer +1; no error carried forward)