Math 2B Version A Quiz 1 Solutions

Exercise 1 (3 points) Find the most general antiderivative of

$$\frac{1}{x} + 5\sec^2(x) + 3\tan(x)\sec(x) + \pi^x + x^3.$$

Solution: $ln|x| + 5\tan^2(x) + 3\sec(x) + \frac{\pi^x}{ln(\pi)} + \frac{x^4}{4} + C$

Exercise 2 (3 points) Suppose $f''(x) = e^x$ and suppose $f'(0) = \pi$ and $f(0) = 2$. Find $f(x)$.

Solution: Taking antiderivative of $f''(x)$,
$f'(x) = e^x + C$ so as $f'(0) = \pi$, $f'(x) = e^x + \pi - 1$

Taking the antiderivative of $f'(x)$,
$f(x) = e^x + (\pi - 1)x + C$ so as $f(0) = 2$, $f(x) = e^x + (\pi - 1)x + 1$

Exercise 3 (4 points)
Estimate the area under the graph of $f(x) = x^3$ from $x = 0$ to $x = 2$ using four approximating rectangles (of the same width) and right endpoints.

Solution: We divide up the interval $[0, 2]$ to four intervals of the same length: $[0, \frac{1}{2}], [\frac{1}{2}, 1], [1, \frac{3}{2}], [\frac{3}{2}, 2]$ and since it asks for right endpoint approximation, we get

Approximate Area Under Graph$=\frac{1}{2}f(\frac{1}{2}) + \frac{1}{2}f(1) + \frac{1}{2}f(\frac{3}{2}) + \frac{1}{2}f(2) = \frac{25}{4}$