MATH 126 – Written Homework #1

Due: Monday, September 8, 2025 on Canvas

1. Evaluate the following limits:

A. $\lim_{x \to 0} \dfrac{3x^2 + 2x + 4}{e^{2x}}$

B. $\lim_{\theta \to \frac{\pi}{2}} \dfrac{\sin(\theta) - \theta}{\theta^2}$

C. $\lim_{x \to \infty} \dfrac{3x^3 - 2x}{4x^3 + 2x^2 + 8}$

D. $\lim_{x \to 1} \dfrac{x - 1}{1 - \cos(\pi x)}$

2. Find the derivatives of the following:

A. $\cos(x) + 4\pi$

B. $e^x \tan(x)$

C. $\ln(x^2 + 4)$

D. $\dfrac{4x^2 - 2}{x^6}$

3. Find the equation of the tangent line to the function

$$f(x) = x + \frac{e^x - 1}{x}$$

at $x = 1$.

4. Write out all the terms and find the sum

$$\sum_{j=4}^{10} j^2.$$

5. Suppose that

$$\sum_{i=1}^{100} a_i = 15 \quad \text{and} \quad \sum_{i=1}^{100} b_i = -12.$$

Compute the following sums:

A. $\displaystyle\sum_{i=1}^{100}(a_i + b_i) =$

B. $\displaystyle\sum_{i=1}^{100}(b_i - a_i) =$

C. $\displaystyle\sum_{i=1}^{100}(3a_i - 4b_i) =$