Quiz #0 (Diagnostic Quiz), 1/14
Math 157 (Calculus II), Spring 2025

This quiz is designed to check your knowledge of Calculus I material. It will not be graded.

1. Let $f(x) = \dfrac{2x-2}{x^2-1}$. Compute the following limits:

$$(a)\ \lim_{x\to 1} f(x) \qquad (b)\ \lim_{x\to 0} f(x) \qquad (c)\ \lim_{x\to -1} f(x)$$

2. Compute the following derivatives:

$$(a)\ \frac{d}{dx}(\,2x^3+3x^2-3x+7\,) \qquad (b)\frac{d}{dx}(\,\sin(x^2)\,) \qquad (c)\frac{d}{dx}(\,xe^x\,) \qquad (d)\frac{d^2}{dx^2}(\,xe^x\,)$$

3. Find the slope of the tangent to the curve $y = \sin(x^2)$ at the point $(x, y) = (0, 0)$.

4. Consider the function $f(x) = x^2 - x + 1$ defined on the closed interval $[0, 1]$. Find the location and values of the minimum and maximum of $f(x)$ on this interval.

5. Compute the following definite integrals:

$$(a)\ \int_0^1 x^3 + 2x + \sqrt{x}\ dx \qquad\qquad (b)\ \int_1^e \frac{2}{x}\ dx$$

6. Compute the following indefinite integrals using the u-substitution technique:

$$(a)\ \int x\sqrt{x^2+1}\ dx \qquad\qquad (b)\ \int \frac{\cos(x)}{\sin(x)}\ dx$$