

Name: _____ / 25

There are 25 points possible on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. **[9 points]** You and your friend leave campus at the same time. You walk due north at 4 kilometers per hour while your friend walks due east at 6 kilometers per hour. After you have traveled 2 kilometers, at what rate is the distance between you changing?

2. [8 points] Let $g(x) = x + 6e^{2x}$.

a. Find the linear approximation of $g(x)$ at $x = 0$.

b. Find the differential of $g(x)$.

c. If x changes from $x = 0$ to $x = 0.1$, estimate how much you expect $g(x)$ to change. Express your answer as a decimal or as a simplified fraction.

3. [8 points] Let $h(x) = 3x^4 - 4x^3 + 1$.

a. Find all critical points of $h(x)$.

b. Determine the absolute maximum and absolute minimum of $h(x)$ on the interval $[-1, 2]$

maximum value of $h(x)$: _____

minimum value of $h(x)$: _____