

Math 2215 - Calculus 1

Quiz #11 - 2016.09.27

Solutions

Compute the intervals of increase and decrease for the function $f(x) = 3x^4 + 8x^3 + 6x^2 + 2$.

We take a derivative first:

$$\begin{aligned}f'(x) &= 12x^3 + 24x^2 + 12x \\ &= 12x(x^2 + 2x + 1) \\ &= 12x(x + 1)^2\end{aligned}$$

So critical points are at $x = 0$ and $x = -1$. Plugging in points on the the three intervals $(-\infty, -1)$, $(-1, 0)$, and $(0, \infty)$ yields that the derivative is positive (and thus $f(x)$ is increasing) on the interval $(0, \infty)$, and is decreasing (where the derivative is negative) on $(-\infty, -1) \cup (-1, 0)$.