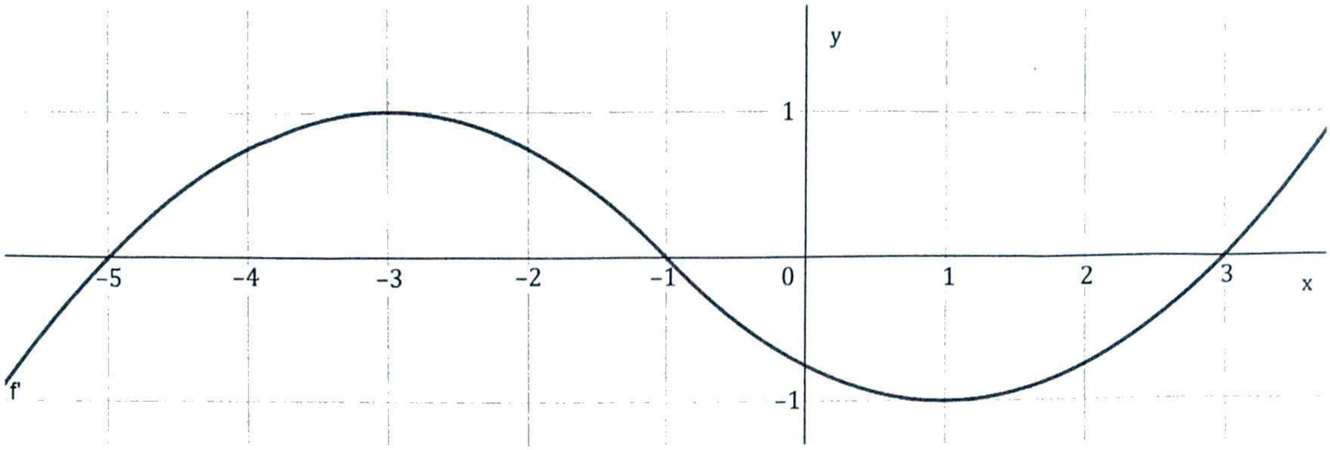
MA 16010 Quiz 9 (Lessons 21, 22)

Write your name, section number (399 for 8:30, 418 for 9:30), and quiz number on the top of your quiz, **front and back.** You may use a one–line calculator.

1. Below is the graph of $f'(x)$, the **derivative** of a function $f(x)$.



Determine at which x the function $f(x)$ has relative maximum and at which x it has relative minimum. Find the x–coordinates of all inflection points of $f(x)$.

2. Compute

$$\lim_{x\to\infty} \frac{x^2 + 4x^3 + 3x^4 - 2}{5x^3 - 7x^4 + x}.$$

$\boxed{1.}$

crit. points = where $f'(x) = 0$: $x = -5$, $x = -1$, $x = 3$

rel. maximum at $\underline{\underline{x = -1}}$ (f' changes from >0 to <0)

rel. minimum at $\underline{\underline{x = -5}}$, $\underline{\underline{x = 3}}$ (f' changes from <0 to >0)

inflection points = points of rel. extrema of $f'(x)$: $\underline{\underline{x = -3}}$, $\underline{\underline{x = 1}}$

$\boxed{2.}$

$$\lim_{x\to\infty} \frac{x^2 + 4x^3 + 3x^4 - 2}{5x^3 - 7x^4 + x} = \lim_{x\to\infty} \frac{3x^4}{-7x^4} = \lim_{x\to\infty} -\frac{3}{7} = \underline{\underline{-\frac{3}{7}}}$$

highest degree terms