

Name (print): _____ Signature: _____

You have 30 minutes. Show your work. Notes, calculators not allowed! Problems are on both pages.

Problem 1. (6 pts) Find the limits:

$$\lim_{x \rightarrow \infty} \frac{x^2 - 5x}{\ln(3x) + 1}$$

$$\lim_{x \rightarrow 0} \frac{\sin x - x}{x^3}$$

Problem 2. (5 pts) Find all local minima and all local maxima for $f(x) = x^7(x - 2)^6$.

Problem 3. (3 pts) Find the limit:

$$\lim_{x \rightarrow 1} \frac{x^3 - 3x + 2}{2x^3 - x^2 - 4x + 3}$$

Problem 4. (6 pts) Jane is located 8 km out from the nearest point A along a straight shoreline in her sea kayak. Hunger strikes and she wants to make it home for lunch; see picture. Jane can paddle at 3 km/hr and walk at 6 km/hr. She wants to make it home as soon as possible. Where should she beach the kayak and how long will it take her to get home?