

Sample Exam Problems

Problem 1. Let $f(x) = \frac{4}{5}x^5 + 2x^4 - 20x^3 + 9$.

- (a) Find the critical points of $f(x)$.
- (b) Find the intervals where $f(x)$ is increasing.
- (c) For which critical points does the first derivative change sign from positive to negative, as in the First Derivative Test?

Problem 2. Let $f(x) = x^4 - 12x^2 + 8$.

- (a) Find the critical points of $f(x)$.
- (b) Find the inflection points of $f(x)$.
- (c) Find the intervals where $f(x)$ is concave down.
- (d) Which critical points have a negative second derivative, as in the Second Derivative Test?