

SECTION 4.5: DERIVATIVES AND THE SHAPE OF THE GRAPH (DAY 1)

1. When f increases, decreases and its derivative.

2. The First Derivative Test

3. For the function $f(x) = \frac{2}{3}x^3 + x^2 - 12x + 7$:

- (a) Determine the intervals where $f(x)$ is increasing or decreasing.
- (b) Use the First Derivative Test to identify the location of all local extrema.
- (c) Use technology to confirm your work.

4. Identify all local extrema for $f(x) = x^2e^{-x}$.

5. Concavity and points of inflection

6. Test for Concavity

7. Determine the intervals for which the function $f(x) = \frac{2}{3}x^3 + x^2 - 12x + 7$ is concave up and concave down. Identify the x -coordinate of any inflection points.

8. Do the same for $f(x) = x^2e^{-x}$.