

East Los Angeles College
Department of Mathematics
Math 261
Test 3

Determine the absolute max and absolute min for the following functions over the given interval.

1. $f(x) = (x^2 + 2x)^3$ over $[-2,1]$

Determine the intervals of increasing/decreasing, local max and local min, intervals of concavity, inflection points (if any).

2. $f(x) = \frac{1}{1-x^2}$

3. $f(x) = x\sqrt{2+x}$

Determine the following limits at infinity

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

5. $\lim_{x \rightarrow \infty} \frac{5x-2}{4x+1}$

6. $\lim_{x \rightarrow \infty} (\sqrt{4x^2 + 3x} - 2x)$

7. $\lim_{x \rightarrow -\infty} (x^3 - x^7)$

8. Two cars start moving from the same point. One travels South at 80 miles per hour and the other travels West at 35 miles per hour. At what rate is the distance between the cars increasing 4 hours later?

9. A particle moves along a curve the curve at $y = 2\cos\left(\frac{\pi x}{2}\right)$. As the particle passes through the point $(0,2)$ its x-coordinate is increasing at a rate of $\sqrt{10}$ cm/sec. How fast is the distance from the particle to the origin changing at this instant?

Determine the linearization function at the indicated points for the following functions.

10. $f(x) = \tan(x)$ at $a = \frac{\pi}{6}$

Use the linearization functions above to approximate the following expressions.

11. $\tan(0.48)$ see 10