

Name: _____

Math 1311
Test III
Spring 2004

1. Find the *exact* coordinates of the inflection points and critical points marked on the graph of $f(x) = x^4 - 10x^3 - 250$ (Fig. 1.)

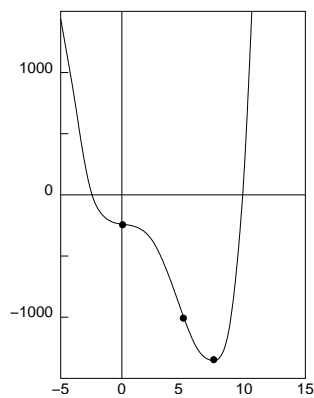


Figure 1:

2. Apply the second derivative test to find the local maxima and local minima of $f(x) = (x^2 - x)e^{-x}$ and apply the inflection point test to find all inflection points.

3. Evaluate the indefinite integral of

$$\int \frac{(3x + 4)^2}{\sqrt{x}} dx.$$

4. Lydia shoots an arrow straight upward from the ground with initial velocity 320 ft/s.

(a) How high is the arrow after exactly 3 s have elapsed?

(b) At what time is the arrow exactly 1200 ft above the ground?

(c) How many seconds after its release does the arrow strike the ground?

5. First calculate (in terms of n) the sum to approximate the area A of the region under

$$f(x) = 9 - x^2$$

on the interval $[0, 3]$. Then find A exactly by taking the limit as $n \rightarrow \infty$.