Exam 2

Student Name:_____

Student ID#:_____

Each problem is worth 6 points. Give a <u>complete</u> solution to receive the full credit!

1. Find the zeros of the function $f(x) = x^3 - 9x$.

2. Find the intervals on which the function $f(x) = x^3 - 9x$ is positive.

3. Find the intervals on which the function $f(x) = x^3 - 9x$ is decreasing.

4. Use the second-derivative test to find all relative extreme points of $f(x) = x^3 - 9x^2 + 24x$.

5. Find the vertical and horizontal asymptotes of the function $f(x) = \frac{1}{x+51} - 2022$.
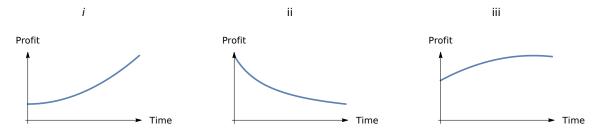
6. Find the open intervals on which $f(x) = \frac{x}{x^2+2} - 2022$ is concave downward.

7. Determine the x-coordinates of all inflection points of the function $f(x) = \frac{x}{x^2+2} - 2022$.

8. Find the domain and the range of the function $f(x) = x + x^{-1}$.

9. Let $f(x) = x^3 - \frac{3}{2}x^2$ on the interval $[-1, 2]$. Find the absolute maximum and absolute minimum of $f(x)$ on this interval.

10. Among the following graphs of three different function identify the one:

i

Profit

Time

ii

Profit

Time

iii

Profit

Time

(a) representing the function which has the positive first derivative and the negative second derivative;

(b) representing the function which is increasing and concave upwards;

(c) representing the function which looks like it might have one critical number.