Exam 3

NAME: _____

No calculators!

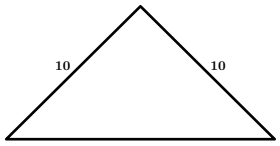
1. (4 points) Find the absolute maximum and absolute minimum values of

$$f(x) = x - 2\sqrt{x}$$

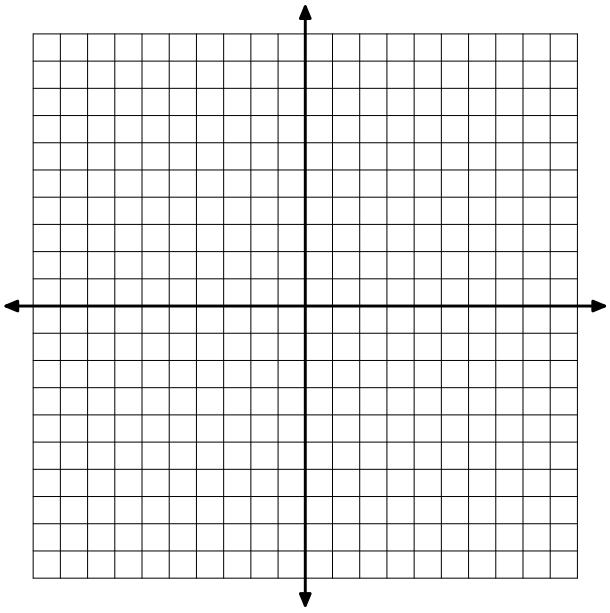
on the interval $[0, 4]$.

2. (4 points) Find $f(x)$ if $f''(x) = 12x - 10$ and $f(0) = 6$ and $f'(0) = 1$.

3. (6 points) An isosceles triangle has congruent sides of length 10 mm each. Find the length of the third side which maximizes the triangle's area. (Note: The answer is not 10 mm.)



4. (10 points) Graph $f(x) = x^3 - x^2 - x + 1$. To get full credit, you must give all critical numbers, local extrema, inflection points, intervals of increase/decrease, and concavity.



Critical Numbers

Local Extrema

Intervals of Increase

Intervals of Decrease

Concavity

Inflection Points

5. (10 points) Consider the function

$$f(x) = \frac{x^2}{x+6}.$$

(a) (2 points) Find all asymptotes for the graph of $f(x)$.

(b) (3 points) Find critical numbers, intervals of increase and decrease, and local extrema.

(c) (3 points) Describe the concavity and give all inflection points.

(d) (4 points) Graph $f(x)$. Please scale the grid to fit your graph.