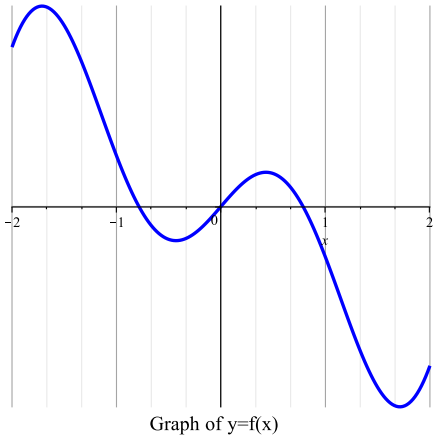
Some Sample Problems for Exam 1

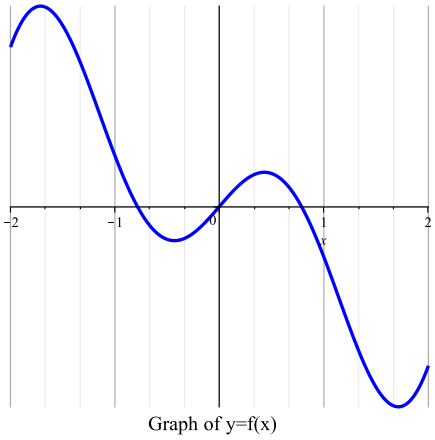
These are only a few *additional* problems to help you prepare for the exam. You should also be certain that you completely understand the WeBWorK assignments, Problems Sets, Reading Assignments, in-class work, and your class notes.

1. Let $f(x) = \dfrac{2x^2 + x - 6}{x^2 - 3x - 10}$
   (a) Where is f continuous? Give your answer in interval notation.
   (b) Does f have any vertical asymptotes? If so, where? What is the behavior of f on each side of the asymptote(s)?
   (c) Does f have any horizontal asymptotes? If so, where?

2. The graph of $y = f(x)$ is shown below. Let $F(x)$ be an antiderivative of $f(x)$.



(a) Sketch the graph of $y = f'(x)$



(b) Sketch the graph of $y = F(x)$

3. (a) Find the exact solutions to the equation $e^{3x}\ln(x+2) - 7e^{3x} = 0$
   (b) Find all solutions to $2\cos(\theta)^2 - \cos(\theta) - 1 = 0$ that lie in the interval $[0, 2\pi)$.
   Hint: Factor $2x^2 - x - 1 = 0$

4. Use the definition of the derivative to find $f'(3)$ if $f(x) = 5x^2 - 2x$.

5. Find equation of the line tangent to $y = x^3 - \dfrac{5}{x^2} + 7$ at $x = 1$.

6. Let $f(x) = x^{7/2} - 2x^3 + x^2 - x + 2$
   (a) Show that $f(x)$ has a local minimum value between $x = 1$, and $x = 3$
   Hint: Think about derivatives and then apply the IVT.
   (b) Approximate the x-value where the minimum occurs accurate within 0.2 of its exact value.

7. *And be sure to review the WeBWorK, Problem Sets, in-class work, and Reading Assignments!*