Math 110 - Section 3
Exam #2 - Sample study problems

Very important: These problems do not outline everything that will or will not be on the exam! They should be about as difficult as the exam problems and similar in flavor, however the goal of the exam is to test understanding - not regurgitation.

1. If $f(x)$ is any function, what combination of translations and flips would flip $f(x)$ horizontally, move it left 2, up 3, and shrink it to be only half it's height.

2. Let $g(x) = x^2 + 3x + 2$ and let $h(x) = x^2 - 2x - 3$. Will the domain of $\left(\frac{g}{h}\right)(x)$ be the same as the domain of $\left(\frac{h}{g}\right)(x)$?

3. If $a(x) = x^3 - \sqrt[3]{x} + \pi^2$ and $c(x) = 10 - \sqrt[3]{x} + 2\pi^2$, find a function $b(x)$ so that $(a - b)(x) = c(x)$.

4. If $f(x) = |x| + 5$ and $g(x) = |x| + 3$, will $(f \circ g)(x) = (g \circ f)(x)$?

5. Write $j(x) = (2x - 9)^6 + 11$ as a composition of two functions (don't use the trivial solution).

6. Write the equation for the line paralell to $h(x) = 2x - 6$ which passes through $(1, 6)$.

7. Rewrite $f(x) = 2x^2 - 12x + 7$ in standard form and describe the vertex.

8. Let $f(x) = 4 - 4x - 3x^2 + 2x^3 + x^4$.
   (a) Describe the end behavior of $f(x)$
   (b) Use a graphing calculator to help find the zeros of $f(x)$, but solve the equation algebraicly
   (c) Can there exist a polynomial $g(x)$ such that $f(x) = (x + 5)g(x)$?

9. Construct a degree 4 polynomial $h(x)$ such that $h(2) = 0$, $h(-4) = 0$, $h(-1) = 0$ and $h(-\frac{1}{2}) = 0$. Additionally, $h(x)$ must pass through the point $(1, 45)$

10. The Kelvin scale is a way of measuring temperature from absolute zero (there is actually a temperature which can't get any colder!). If 0 degrees kelvin is equal to -459 Fahrenheit, and water freezes at 273 kelvin (that's 32 degree Fahrenheit), write a linear function for the temperature in Kelvin as function of degrees Fahrenheit.

You should review all of sections 1.5, 1.6, 2.1, 2.2, 3.1, and 3.2, since anything in those sections is fair game for the exam.