Name: _____

Section: _____

# MATH 32 FALL 2012

# MIDTERM 1 - PRACTICE EXAM

Total time: 50 minutes

No books, notes, calculators, or electronic devices allowed.

Please show your work and provide explanations where appropriate. If you need more space, you may use the backs of the pages or extra paper, but make a note that you did so.

| Problem | Score | Out of |
|---|---|---|
| 1 | | 6 |
| 2 | | 6 |
| 3 | | 12 |
| 4 | | 12 |
| 5 | | 12 |
| 6 | | 12 |
| Total: | | 60 |

# MATH 32 FALL 2012 MIDTERM 1 - PRACTICE EXAM

(1) (6 points) Find all values of $x$ satisfying the inequality

$$\left|\frac{1}{x}\right| \geq 5$$

(2) Consider the polynomials

$$p(x) = 2x^2 + 1$$

$$q(x) = x^3 - x + 1$$

(a) (3 points) Write the product $(pq)(x)$ in expanded form (i.e. as a sum of terms, each of which is a constant times a power of $x$)

(b) (3 points) Write the composition $(p \circ q)(x)$ in expanded form.

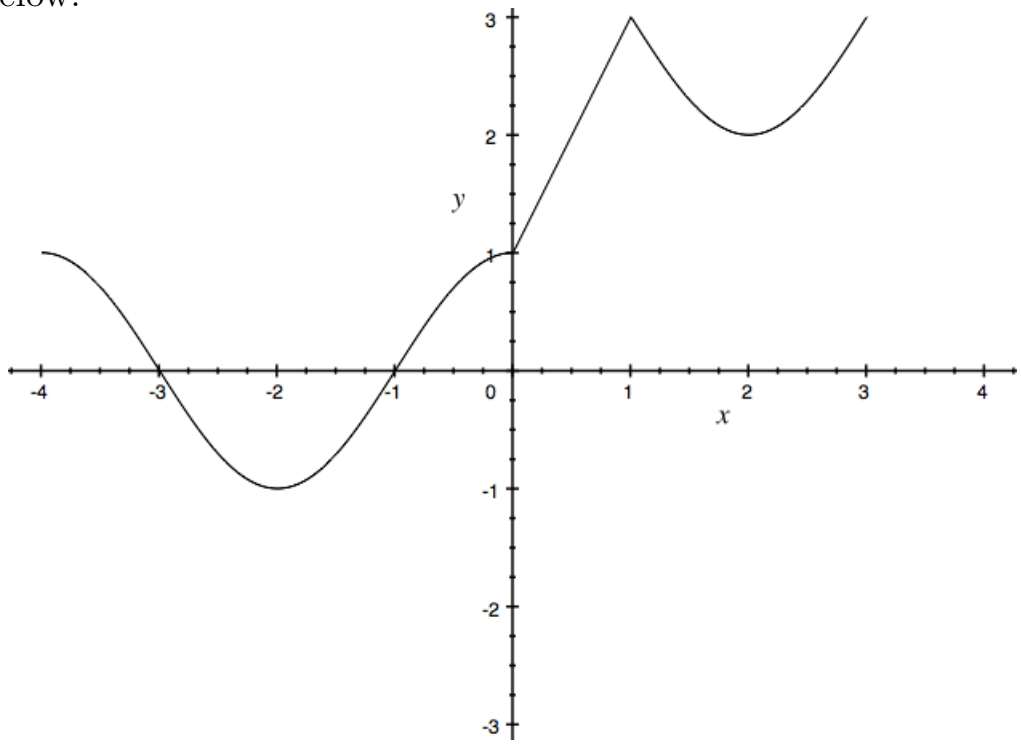
(3) Let $L$ be the line containing the points $(1, 1)$ and $(5, 13)$.

(a) (3 points) Find an equation for $L$.

(b) (3 points) Find an equation for the line $L'$ which is perpendicular to $L$ and contains the origin $(0, 0)$.

(c) (6 points) Find the point of intersection of $L$ and $L'$.

(4) Let $f$ be the function with domain $[-4, 3]$ whose graph is pictured below:




(a) (3 points) What is the largest interval on which $f$ is increasing?

(b) (3 points) Let $F$ be the function defined by restricting the domain of $f$ to the interval from (a). Estimate the value of $F^{-1}(0)$.

(c) (6 points) Sketch a graph of $F^{-1}(x)$.

(5) Let $f(x) = 3x^2 - 2x + 1$.

(a) (6 points) The graph of $f$ is a parabola. Find the coordinates of the vertex of this parabola.

(b) (6 points) Find all real solutions to the equation $f(x) = 0$.

(6) Let $f(x) = x^{-3} + 1$.

(a) (6 points) Is $f$ even, odd, or neither? Explain.

(b) (6 points) Sketch a graph of $f$.