Name: _____

Math 141 Midterm Review

Most of these problems are from previous quarters' exams. Keep in mind that it does not cover every possible type of question that could appear on your exam.

1. (Where does the circle of radius 10 centered at (-3, 2) intersect the vertical line $x = 5$?

2. Let $f(x) = \sqrt{-3x - 12}$.
(a) What is the domain of $f(x)$?

(b) What is the range of $f(x)$?

3. Let $f(x) = 2x^2 - 4x + 1$.
(a) What is $f(5)$?

(b) What is $f(2x)$? (Don't forget to simplify!)

(c) Find $\frac{f(a+h)-f(a)}{h}$.

(d) If $f(x) = 7$, find x.

4. Does the equation $2x^2 + 3y = 6$ define y as a function of x? Why or why not?

5. Is the function $f(x) = 2x^3 - 4x^{-3}$ even, odd, or neither?

6. Let $f(x) = \begin{cases} x + 5 & \text{if } x < -2 \\ x^2 - 1 & \text{if } -2 \leq x \leq 2 \\ 3 & \text{if } x > 2 \end{cases}$.
(a) Sketch the graph of $f(x)$.

(b) State any interval(s) on which the graph of $f(x)$ is decreasing.

7. State, in order, the steps you would follow to obtain the graph of $g(x) = \frac{1}{4}(x - 5)^3 - 2$ from the graph of $f(x) = x^3$. (You do *not* need to sketch the graph.)

8. A ball is thrown in the air. It's height after t seconds can be modeled by the formula $h(t) = -16t^2 + 80t + 5$.
(a) What is the average speed of the ball (the average rate of change of the ball's height) from $t = 0$ to $t = 2$?

(b) What is the maximum height the ball reaches?

9. Let $f(x) = 3x^2 - 5x$ and $g(x) = x - 2$. Find the following. Simplify (when applicable).
(a) $(fg)(1)$

(b) $(f - g)(x)$

(c) $(f \circ g)(x)$

10. (3 points each) Let $f(x)$ be the function given by the table

x	$f(x)$
-2	4
0	2
2	3
3	-2

(a) Find $(f \circ f)(0)$

(b) Find $f^{-1}(-2)$.

11. Let $f(x) = (x^3 - 2)^5$. Find $f^{-1}(x)$.