Name:
Recitation Instructor:
Recitation Day and Time:

Studio College Algebra – Exam 2 – March 2015

Directions: You will find 16 problems listed below. Each problem is worth 5 points. No notes/books/friends are allowed. Graphing calculator models above the level of a TI-84 plus are not allowed (in particular, calculators with a built in CAS and/or QWERTY keyboard are not allowed). You have one hour to complete this exam. SHOW ALL WORK!

1. Solve $t^2 - 4t - 9 = 0$.

2. Write $x^2 + 8x + 3$ in the form $a(x - h)^2 + k$.

3. A parabola has vertex at $(1, 3)$ and passes through the point $(-1, 8)$. What is the equation of the parabola? Write your answer in the form $y = a(x - h)^2 + k$.

4. The height of a ball in the air off the ground in meters, t seconds after it is thrown, is given by the equation $s(t) = -4.9t^2 + 12t + 15$. When does the ball hit the ground?

5. Given $h(x) = 3x - 5$ and $k(x) = x^2 - 3x$, find $k(x) - h(x)$.

6. Given $r(x) = 6x - 1$ and $m(x) = x^3 + 2x$, find $r(x)m(x)$.

7. Consider the table of values given below for two functions, $f(x)$ and $g(x)$:

x	-2	-1	0	1	2
$f(x)$	-3	1	-2	0	-1
$g(x)$	1	-3	-2	4	5

(a) Using the table above, find $f(1) + g(1)$.

(b) Using the table above, find $f(f(2))$.

8. Solve the quadratic inequality $x^2 - 9 > 16$. (Hint: Use either a graphing or number line method discussed in lecture.)

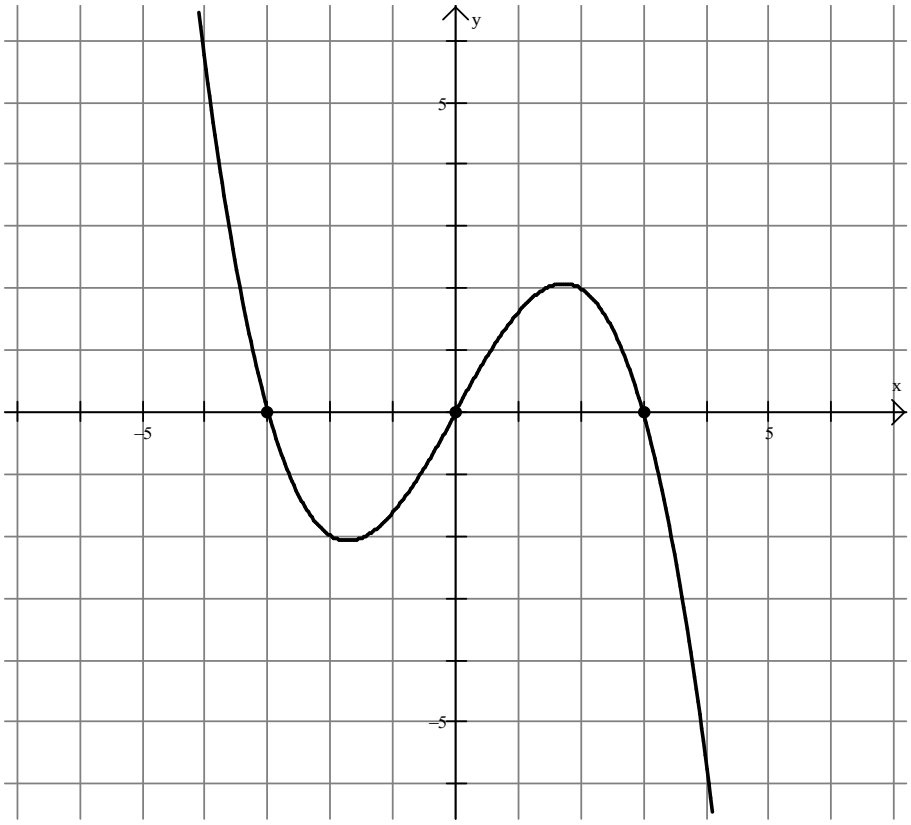
9. Given $f(x) = \dfrac{x-5}{x}$, find $f^{-1}(x)$.

10. Solve and check: $x = \sqrt{x+2}$

11. The profit function for selling x units of a certain product is given by $P(x) = -x^2 + 8x - 2$, where $P(x)$ is measured in **thousands**. For what number of units will there be at least \$5000 in profit? *Hint: instead of using the number 5000 as part of your calculations, what number should be used?*

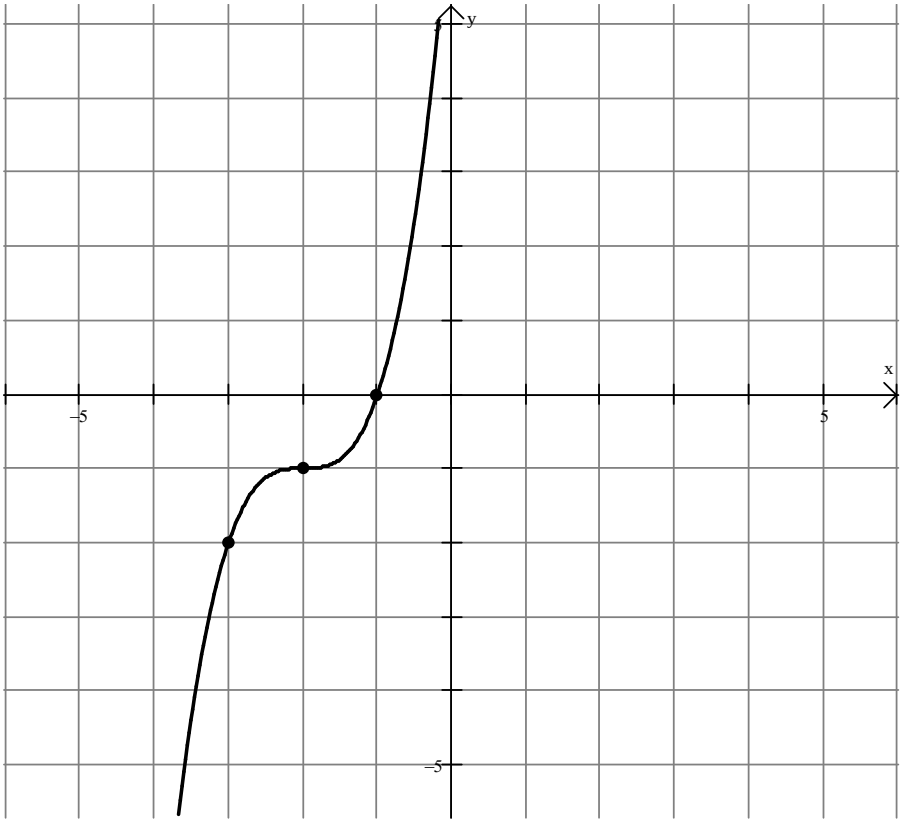
12. A 3-dimensional cartoon portrays an expanding sphere that grows in volume according to the function $V(r) = \frac{4}{3}\pi r^3$, where r is the radius of the sphere, in millimeters. If the radius grows according to the function $r(t) = 2t$, where t is measured in seconds, find and interpret $V(r(2))$.

13. Given the graph of $f(x)$ below, graph $f(x+1)-2$.



14. Insect resting metabolic rate (RMR) has been found to be scaled positively with body mass (M) according to the equation $RMR = 4.14(M^{0.66})$, where M is measured in mg and RMR is measured in mm^3O_2 per hour. Find the RMR of an insect weighing 1.4 grams.

15. Consider the graph of $f(x)$ given on the grid below. Sketch $f^{-1}(x)$ on the same grid.



16. Consider the following piecewise function. Write TRUE or FALSE beside each of the statements given below.

$$f(x) = \begin{cases} 6, & x \leq -3 \\ x^4, & -3 < x \leq 2 \\ x, & x > 2 \end{cases}$$

(a) $f(2) = 16$.
(b) $f(2) = 2$.
(c) $f(-3) = 6$.
(d) $f(-3) = -3$.
(e) $f(-3) = 81$.