Name:

Recitation Instructor:

Recitation Day & Time:

Total/100	Grade

MATH 100 College Algebra – **Exam I**

7:15–8:15pm, Tuesday February 6, 2007

Check that that you have all three pages. SHOW ALL YOUR WORK.

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1. (6 points) Simplify $\dfrac{(y^2/x^{-1})^3}{(x^2y^{-3})^2}$, avoiding negative exponents (you may assume that $x, y \neq 0$):

2. (7 points) Write as a rational power of a (assume a is positive):

(i) $\dfrac{\sqrt[3]{a^5}}{\sqrt[6]{a^4}}$

(ii) $\sqrt[5]{a^2\sqrt{a}}$

3. (7 points) Simplify by extracting squares (y could be negative in (a)):

(a) $\sqrt{9y^{10}} =$

(b) $5\sqrt{45} - 3\sqrt{80} =$

4. (5 points) Multiply out and simplify: $(x^2 - 2x + 3)(x^2 + 2x + 3)$.

5. (6 points) Simplify: $\dfrac{x^3 - 4x}{x^3 - 5x^2 + 6x}$.

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6. (16 points) Factor the following polynomials as far as possible:

(a) $2x^2 + 7x - 15 =$

(b) $25x^2 - 4 =$

(c) $(x-2)(x^2 - x - 5) - (x-2)^3 =$

(d) $3x^3 - 2x^2 - 27x + 18 =$

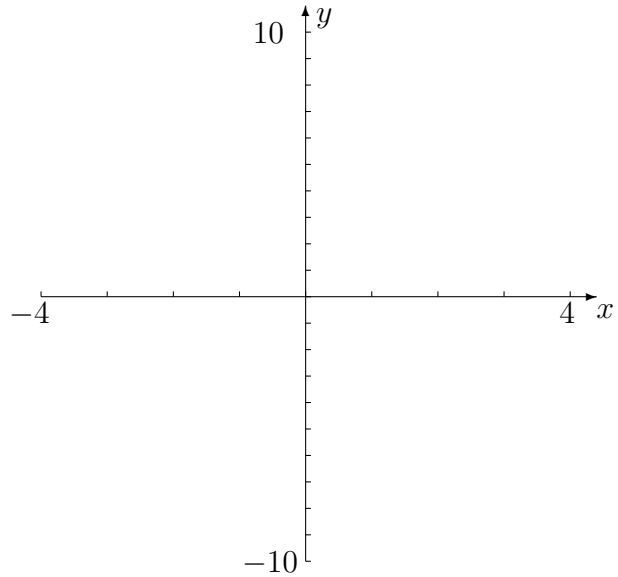
7. (6 points) Simplify: $\dfrac{\dfrac{y-2}{y+1}}{\dfrac{3}{y+1} - \dfrac{2}{y}}$.

8. (7 points) Perform the subtraction and simplify: $\dfrac{5}{x^2+x-6} - \dfrac{8}{x^2-2x-15}$.

9. (8 points) Use your calculator to sketch the graph of

$$y = -x^3 + x^2 + 5x - 2,$$

with the window settings shown.
Find the coordinates of any intercepts correct to three decimal places:



x-intercepts=_____

y-intercept=_____

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10. (6 points) (a) What is the distance between the points $(-2, 1)$ and $(1, -3)$?

(b) Find an equation for the circle with center $(1, -3)$ which passes through the point $(-2, 1)$.

11. (5 points) Rationalize the denominator and simplify: $\dfrac{3+\sqrt{7}}{2-\sqrt{7}}$.

12. (7 points) (a) The slope of the line passing through $(-1, 5)$ and $(1, -3)$ is $m =$ _____.

(b) An equation for the line passing through the two points in part (a) is $y =$ _____.

13. (6 points) (a) The slope of a straight line **perpendicular** to $3x - 4y = 7$ is $m =$ _____.

(b) An equation for the line through the point (1,3) perpendicular to $3x - 4y = 7$ is $y =$ _____.

14. (4 points) What is the domain of the function $f(x) = \dfrac{x^3 - 4x}{x^2 + 7x + 12}$?

15. (4 points) Let $g(x) = x^2 - 2x + 3$. Find and simplify $g(1 - x)$.

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