Math 229
Algebra Review Worksheet
5/30/2008

Name:_____

1. Simplify each of the following:

   (a) $-\left|-\left(-\left(-\frac{2}{3}+1\right)\right)\right|$ (b) $\frac{4}{7}-\frac{5}{6}$ (c) $\frac{7}{12}\div\frac{5}{6}$

2. Simplify each of the following using the properties of exponents. Your answer should contain only positive exponents.

   (a) $\left(a^4b^7\right)^3\cdot b^3$ (b) $\left(\frac{a^3b^2c}{a^{-1}b^{-2}c^{-3}}\right)^{-2}$ (c) $\left(\frac{5x^5y^4}{10x^{\frac{1}{2}}y^{-\frac{3}{2}}}\right)^3$

3. Simplify each of the following using the properties of radicals. Your answers should be rationalized. You may assume that all variables represent positive real numbers.

   (a) $\sqrt{48x^5y^6}$ (b) $\sqrt[3]{16x^{11}y^7}$ (c) $\sqrt{\frac{3x^2y}{6xy^3}}$ (d) $\sqrt[3]{\frac{x^2y^{-2}}{5xy^3}}$

4. Simplify each of the following by multiplying out and/or combining terms:

   (a) $(-3x^2+7)-(3x^2+2x-5)$ (c) $(3x-4y)^2$ (e) $(x+3y)(x^2-3xy+9y^2)$

   (b) $(5z+8y)(5z-8y)$ (d) $(5t-\frac{1}{5})(10t+\frac{3}{5})$ (f) $(3x+y)^2-(3x-y)^2$

5. Factor each of the following completely:

(a) $14x^6 - 6x^2y^4 + 4x^3y^5$

(b) $x^2 - xy - 5x + 5y$

(c) $2x^2 + 11x + 15$

(d) $2y^2 - 7y - 15$

(e) $8x^3 + 27y^3$

(f) $16 - x^4$

6. Perform the operations indicated and then reduce to lowest terms.

(a) $\dfrac{x^2 + 4x - 21}{x^2 - 12x + 27} \cdot \dfrac{x^2 - 7x + 12}{x^2 + 3x - 28}$

(b) $\dfrac{x^2 - 2x + 1}{3x^2 + 7x - 20} \div \dfrac{x^2 + 3x - 4}{3x^2 - 2x - 5}$

(c) $\dfrac{3x}{x^2 + 7x + 10} - \dfrac{2x}{x^2 + 6x + 8}$

(d) $\dfrac{\frac{1}{x} + \frac{2}{y}}{\frac{2}{x} + \frac{1}{y}}$

(e) $\dfrac{(x^2 - 5)^4(3x^2) - x^3(4)(x^2 - 5)^3(2x)}{[(x^2 - 5)^4]^2}$

7. Find the real roots of the following quadratics equations either by factoring or by using the quadratic equation:

(a) $x^2 + x = 12$

(b) $3x^2 - 4x + 1 = 0$