Math 116
Homework 01

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1.1

In the following exercies, simplify and reduce to lowest terms.

13. $\dfrac{\frac{xy}{x+y}}{\frac{x^2y}{(x+y)^3}}$

14. $\dfrac{\frac{xy}{x-y}}{\frac{x^2}{y} \cdot \frac{y^3}{x}}$

1.2

In the following exercises, express as a single fraction and simplify.

16. $\dfrac{\frac{1}{x} - \frac{1}{y}}{\frac{1}{x} + \frac{1}{y}}$

21. $\dfrac{4yz}{x^2} - \dfrac{2z}{xy^2} + \dfrac{1}{xyz}$

1.3

In the following exercises, simplify.

7. $2x(y - 3) - y(x + xy) + 2y(x + 1)$

8. $x(y + z) - z(x + y) + 2y(x - z) + 2y(x - z) - x(3y - 2z)$

1.4

10. Show by example that $(x^{-2} + y^{-2})^2 \neq x^{-4} + y^{-4}$; that is, find values for x and y so that the two sides are unequal for those values (*Hint*: Just dive in and try some. Maybe you'll be lucky).

Simplify using only positive exponents:

14. $\dfrac{x^4y^2}{x^{-3}} \div \dfrac{x^3y^{-2}}{y^5}$

1.5

Simplify the expression as much as possible, using rational exponent notation where appropriate:

14. $\left(\dfrac{25}{16}\right)^{-3/2}$

30. If $x^2 + y^2 = 25$, can we conclude that $x + y = 5$? Why or why not?

1.8

1. Represent the following sets of numbers using interval notation and number line representation:

(a) $-1 \le x \le 3$

(b) $-1 < x \le 3$

(c) $-3 \le x < 1$

(d) $-3 \le x \le 4$

3. Represent the following intervals using inequalities:

(a) $(3, 7)$

(b) $(-4, -1]$

(c) $(-\infty, 19]$

(d) $[2, 10)$

(e) $[-2, -1]$

5. Simplify if possible:

(a) $(-\infty, 5) \cap [3, \infty)$

(b) $(-\infty, 5) \cup [3, \infty)$

(c) $(-\infty, -2) \cap [-2, \infty)$

(d) $(-\infty, \infty) \cap [4, 7]$

(e) $[3, 5] \cap (10, \infty)$

(f) $(-\infty, 5] \cap [5, \infty)$