Math101, Sections 2 and 3, Spring 2008
In Class Worksheet #1: 03–05–08

1 Section 5-1

Refer to page 289-290 for the various definitions and rules for exponents. Examples include $a^{-n} = \frac{1}{a^n}$, $(b^n)^m = b^{mn}$, $a^m a^n = a^{m+n}$ and so on.
Here are some review exercises.

1.

a) 4^{-2}.

b) $5^{-1} + 6^{-1}$.

c) $\dfrac{1}{3^{-3}}$.

d) Write $(5t)^{-3}$with only positive exponents.

e) Write $(-6x^3)^{-2}$ with positive exponents.

f) Write $(k^2)^{-3}$ with positive exponents.

The following I see as typical problems we need to be able to solve for the upcoming exam.
Write the following expressions with positive exponents.

2.

a) $\dfrac{(3pq)q^2}{6p^2q^4}$.

b) $\dfrac{(2k)^2m^{-5}}{(km)^{-3}}$.

c) $\dfrac{3^{-1}m^4(m^2)^{-1}}{3^2m^{-2}}$.

2 Section 5-2

What is a polynomial? First I'll tell you what isn't a polynomial. $\frac{1}{x}$ is not a polynomial. Likewise expressions like $x^{1/2}, s^2 - \frac{s}{x}$ and so on are not polynomials. A polynomial is a term or a finite sum of terms in which all variables have whole number exponents and no variables appear in denominators.

For this section, we need to learn how to add and subtract polynomials. We have already seen this before when we introduced the distributive property. Polynomials are added and subtracted by combining like terms.

Let's try the following problems. The directions are 'combine like terms'.

3

a) $5z^4 + 3z^4$.

b) $2c^2 - 4 + 8 - c^2$.

c) $4 - (2 + 3m) + 6m + 9$.

d) $4x - 8 - (-1 + x) - (11x + 5)$.

Another nice trick we can do is add and subtract polynomials by placing like terms in vertical columns. Refer to the textbook for examples of how this works.

3 Section 5-4

This section is about multiplying polynomials. In order to multiply polynomials, we need to import some of our knowledge about how to deal with exponents.

Some multiplication problems we already know how to do, such as

4.

a) $-8m^3(2m^3)$, and

b) $3x(-2x+5)$.

A new one that we haven't seen is

5.

a) $5y(-2y+3)$, and

b) $6k^2(2k-3k^2+1)$.

Perhaps a slightly more exciting problem is to try multiplying

6. $p(p-2)(p+4)$.

There are a few special cases that show up often enough that it is worthwhile memorizing them.

In fact the result that

$$(x+y)(x-y) = x^2 - y^2$$

comes up so often we call it 'Difference of Squares'. This 'difference' refers to the fact that the right hand side has two terms that are squared, subtracted from each other.

Two other examples show up so often that it's worthwhile to remember

$$(x+y)^2 = x^2 + 2xy + y^2,$$

and

$$(x-y)^2 = x^2 - 2xy + y^2.$$

Please, please, PLEASE DON'T EVER write $(x+y)^2 = x^2 + y^2$. Why doesn't this work? Can you think of an example where this actually is true?