Fraction/Exponent Review

If you aren't good with algebra, then this course will make you good with algebra. In the first few weeks, your skills with fractions and exponents will be used frequently. So here is a review of some useful rules and a few practice problems for you to do later (compare with friends for the answers or come ask me after class, but you really shouldn't need an answer key for this).

Rules:

Rule	Example	Comment
$\frac{a}{b} = a \cdot \frac{1}{b} = \frac{1}{b} \cdot a$	$\frac{5}{4} = 5 \cdot \frac{1}{4}$ and $\frac{3x^2}{4} = \frac{3}{4} \cdot x^2$	Don't write mixed fractions in this class! $5.25 = 5 + \frac{1}{4}$ is not the same as $5 \cdot \frac{1}{4} = 1.25$
$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$	$\frac{2}{3}\frac{5}{7} = \frac{10}{21}$ and $\frac{x^3}{4}\frac{9}{x} = \frac{9x^2}{4}$	You should be fast at simplifying products!
$\frac{a}{b} + \frac{c}{d} = \frac{ad+bc}{bd}$	$\frac{3}{2} + \frac{2}{5} = \frac{15+4}{10} = \frac{19}{10}$	Use whatever adding fraction method you know.
$x^a \cdot x^b = x^{a+b}$	$x^4 \cdot x^{0.5} = x^{4.5}$	Remember you can just count! $x^2 \cdot x^4 = (x \cdot x) \cdot (x \cdot x \cdot x \cdot x) = x^6$ (I count 6).
$\frac{x^a}{x^b} = x^{a-b}$	$\frac{4x^9}{5x^2} = \frac{4}{5}\frac{x^9}{x^2} = \frac{4}{5}x^7$	Again you can just count as well $\frac{x^5}{x^2} = \frac{x \cdot x \cdot x \cdot x \cdot x}{x \cdot x} = x^3$ (I counted 3 after cancelling).
$\frac{1}{x^a} = x^{-a}$	$\frac{3x^5}{2} \cdot \frac{11}{x^7} = \frac{33}{2}\frac{x^5}{x^7} = \frac{33}{2}\frac{1}{x^2} = \frac{33}{2}x^{-2}$	In particular $\frac{1}{x} = x^{-1}$.
$\sqrt[b]{x^a} = x^{a/b}$	$8^{2/3} = (8^{1/3})^2 = 2^2 = 4$	Note that $\sqrt{x} = x^{1/2}$.

Now try to see if you can simplify the following.
The goal is to expand, then get each term in the form $???x^{???}$.

1. $\frac{2}{x^7}$
2. $x^{14} \cdot \frac{x^2}{3}$
3. $\frac{5}{x} \cdot \frac{x^7}{4}$
4. $\frac{1}{x^3} \cdot \frac{x}{4}$
5. $(\sqrt[3]{x} + 4)^2$
6. $3\sqrt[5]{x^7}$
7. $\sqrt{x}(2 - x)$
8. $\frac{100}{\sqrt{x}}$
9. $x^2(\sqrt{x} + 2)$
10. $\frac{1}{6} + \frac{2}{7}$
11. $\frac{x}{3}$
12. $\frac{15}{x^2}$