Math 127
Exam 1 Practice Problems

1. Express the following number in scientific notation: .0001093

2. Express the following number in ordinary decimal notation: 4.03267×10^4

3. True or False:

   (a) $(a + b)c = ac + bc$

   (b) If $ab = 1$, then either $a = 1$ or $b = 1$ or both a and b equal 1

   (c) $\dfrac{a}{b} + \dfrac{c}{d} = \dfrac{a + c}{b + d}$

   (d) $\dfrac{a + c}{b} = \dfrac{a}{b} + \dfrac{c}{b}$

   (e) $5^{\frac{1}{2}} = \dfrac{1}{5^2}$

   (f) $(a + b)^2 = a^2 + b^2$

   (g) $x = 0$ is a solution to the equation $\dfrac{x^2}{x} = 0$

4. Simplify the following:

   (a) $\left(\dfrac{3}{4}\right)^{-2}$

   (b) $8^{\frac{4}{3}}$

   (c) $\left(\dfrac{y^{12}}{25z^4}\right)^{-\frac{3}{2}}$

   (d) $\sqrt[5]{32x^{11}y^{14}z^8}$

   (e) $\left(\dfrac{(5xyz)^2 z^{-2}}{2x^{-2}y^2 z^{-4}}\right)^{-1}$

5. Rationalize the denominator in the following expressions:

   (a) $\dfrac{3x}{\sqrt[3]{x}}$

   (b) $\dfrac{2x + 3}{\sqrt{2x} - 1}$

6. Perform the indicated operations and simplify:

   (a) $3(2x^3 - x^2 + 5x) - 2x(3x^3 - 2x^2 + 5x - 3)$

   (b) $(2x^2 + 3x - 2)(x - 2)$

   (c) $(2x + 1)^3$

   (d) $(x^{\frac{1}{3}} + y^{\frac{1}{3}})(x^{\frac{2}{3}} - x^{\frac{1}{3}}y^{\frac{1}{3}} + y^{\frac{2}{3}})$

7. Factor each of the following expressions completely:

   (a) $2x^2 + x - 6$

   (b) $50x^2 + 45x - 18$

   (c) $9x^2 - 49y^6$

   (d) $8x^3 - y^3$

   (e) $6x^3y - 27x^2y - 15xy$

   (f) $3x^3 + x^2 - 3x - 1$

   (g) $x^6 - 1$

8. Simplify the following expressions:

   (a) $\dfrac{3x^2 - 10x + 3}{x^2 - 1} \cdot \dfrac{x^2 + x - 2}{x^2 - 9}$

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

   (c) $\dfrac{\frac{1}{x} + \frac{3}{x-2}}{\frac{4}{x-1} - \frac{2}{x-2}}$

   (d) $\dfrac{\frac{3}{2x+2h+1} - \frac{3}{2x+1}}{h}$

9. Give a specific example of each of the following:

   (a) an identity equation

   (b) a conditional equation

   (c) an inconsistent equation

   (d) a pair of equivalent equations

10. Solve each of the following equations:

    (a) $4(2x - 3) + 2x = 5(3x - 1) + 3$

    (b) $(3x - 2)(2x + 3) = (6x - 1)(x + 2)$

    (c) $\dfrac{x + 2}{x - 1} - \dfrac{x + 1}{x + 3} = \dfrac{3x + 7}{x^2 + 2x - 3}$

11. Solve for n in the following equation: $2n = \dfrac{a - 5n}{3b}$

12. Solve for p in the following equation: $\dfrac{2}{t} = \dfrac{1}{p} - \dfrac{3}{q}$