SMARTS Calculus
Homework #1
(Must show all work)

Home work is due at the beginning of class the Friday July 10, 2009

■ Expand and simplify.
(1 + 2x)(x² - 3x + 1)

■ Perform the indicated operations and simplify.
\[
\frac{u + 1 + \frac{u}{u + 1}}{1 + \frac{1}{c - 1}}
\]
\[
1 - \frac{1}{c - 1}
\]

■ Factor the expression.
6x² - 5x - 6
x³ - 2x² - 23x + 60

■ Simplify the expression.
\[
\frac{2x² - 3x - 2}{x² - 4}
\]
\[
\frac{x³ + 5x² + 6x}{x² - x - 12}
\]
\[
\frac{x}{x² + x - 2} - \frac{2}{x² - 5x + 4}
\]

■ Complete the square.
x² - 16x + 80
3x² - 24x + 50

■ Solve the equation.
3x² + 5x + 1 = 0
x³ + 3x² + x - 1 = 0
- Which of the quadratics are irreducible?
  \[ 2x^2 + 3x + 4 \]
  \[ x^2 + 3x + 6 \]

- Use the Binomial Theorem to expand the expression.
  \[(x^2 - 1)^4\]

- Simplify the radicals.
  \[\sqrt[4]{32x^4} = \sqrt[4]{2} \cdot 2x \]
  \[\sqrt{16a^4b^3} = 4ab\sqrt{a} \]

- Use the Laws of Exponents to rewrite and simplify the expression.
  \[2^{16} \times 4^{10} \times 16^6\]
  \[(2x^2y^4)^{3/2}\]
  \[4\sqrt[4]{x^3/\sqrt{st}} \cdot \frac{t^{1/2} \sqrt{st}}{s^{2/3}}\]

- Rationalize the expression.
  \[\frac{x\sqrt{x} - 8}{x - 4}\]
  \[\sqrt{x^2 + 3x + 4} - x\]

- State whether or not the equation is true for all values of the variable.
  \[\frac{1}{x^{-1} + y^{-1}} = x + y\]
  \[\sqrt{x^2 + 4} = |x| + 2\]
  \[\frac{x}{x + y} = \frac{1}{1 + y}\]