SelfTest: On the Chapter P Quiz you will be asked to...

1. Express number sets using interval notation, graphs, and inequalities.
   a) Express the interval \([2, \infty)\) as an inequality, and then as a number line graph.
   b) Express \(\{x | -2 < x \leq 5\}\) using interval notation and then as a graph.
   c) Express \(-\frac{2}{x}\) using interval notation and as an inequality.
   d) Express \([-4, 0)\) as an inequality and a graph.
   e) Express \(\{x | x \leq -1\}\) using interval notation and then as a graph.

2. Find the intersection & union of two sets of numbers. Express answers using interval notation.
   Find i) \(A \cap B \ldots\) and ii) \(A \cup B \ldots\) for each of the following pairs of sets
   a) \(A = \{x | x < 3\} \text{ and } B = \{x | -2 < x < 5\}\)
   b) \(A = [-1, 6) \text{ and } B = [5, 8]\)
   c) \(A = \{x | x \leq 0\} \text{ and } B = \{x | x < -3\}\)
   d) \(A = (-\infty, 2] \text{ and } B = [2, \infty)\)
   e) \(A = [-1, \infty) \text{ and } B = (1, 3]\)

3. Simplify expressions, with rational exponents, as much as possible (eliminate negative exponents).
   a) \((2x^4y^{-\frac{4}{3}})(8y^2)^{\frac{2}{3}}\)
   b) \((27x^9)^{-\frac{4}{3}}\)
   c) \((\frac{y^9z^{-3}}{y^{-4}z^2})^{\frac{1}{6}}\)
   d) \((\frac{9st^{\frac{3}{2}}}{(27s^3t^{-4})^{\frac{2}{3}}})\)
   e) \(\frac{3x^{1/2}y^3}{x^2y^{-1/2}}\)

4. Factor an expression involving rational exponents. EG: Factor completely:
   a) \(x^{-\frac{3}{2}} + 2x^{\frac{1}{2}} + x^{\frac{1}{2}}\)
   b) \(x^{-\frac{1}{2}}(x+1)^{\frac{1}{2}} + x^{\frac{1}{2}}(x+1)\)
   c) \(4x^{\frac{1}{2}} + 5x^{\frac{1}{2}} + x^{\frac{3}{2}}\)
   d) \(3(1+x)^{\frac{1}{3}} - x(1+x)^{-\frac{2}{3}}\)
   e) \(3x^{\frac{3}{2}} - 9x^{\frac{1}{2}} - 6x\)
   f) \(x^3 - 64\)
   g) \(x^3 - 64\)

5. Simplify a complex rational expression. EG: Simplify completely:
   a) \(\frac{1}{t+h} - \frac{1}{t}\)
   b) \(\frac{1}{1+a^n} + \frac{1}{1+a^{-n}}\)
   c) \(x^2 - \frac{y^2}{x^2 + \frac{1}{y^2}}\)
   d) \(\frac{1 + \frac{2}{c-2}}{1 - \frac{2}{c-2}}\)
   e) \(\frac{y - x}{x - y}\)
   f) \(\frac{1 - \frac{1}{y}}{x - \frac{1}{x}}\)