MAT 1400: Quiz 1   **Name:** _____
February 13, 2019

1. (a) Simplify, combining all like terms and eliminating any negative exponents:

   $$\left(x^6 y^{-4}\right)^{\frac{3}{2}}$$

   (b) The following expression is equal to a positive integer. What is it?

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

2. (a) Simplify the following expression as much as possible. Assume $h \neq 0$.

   $$\frac{(x+h)^2 - x^2}{h}$$

   (b) Solve the following inequality. You may express your solution using either algebraic symbols or interval notation.

   $$\frac{(x)(x-1)}{(x+1)(x+2)} > 0$$

3. Solve the following equations:

   (a) $\sqrt{5-x} + 1 = x - 2$. (Warning: check your solutions! Remember that $\sqrt{5-x}$ must be positive.)

   (b) $(x+1)^{-\frac{1}{2}} + (x+1)^{\frac{1}{2}} = 0$

4. What is the equation of the circle in the (x, y)-plane with center at $(1, 1)$ and radius 2?

5. The radiator in a car is filled with a solution of 40% anti-freeze and 60% water. If the capacity of the radiator is 5 L, how much of this coolant mixture should be drained and replaced with pure anti-freeze in order to raise the concentration of anti-freeze to 50%?