This is a list of the concepts we have studied in Chapter 1. You should be able to answer questions dealing with these concepts. Study the practice problems, guided examples, WeBWorK, and examples worked in the textbook, as well as the practice test.

This first unit is an introduction to a wide variety of concepts which we will be revisiting for specific functions later in the course.

- Algebra
  - solving linear equations
  - completing the square
  - the quadratic formula
  - interval notation, set notation, number line notation
- Sketching Linear Equations
  - slope $m = \dfrac{\Delta y}{\Delta x}$
  - parallel lines have same slope, but different y-intercept
  - perpendicular lines have slopes whose produce is -1
  - equations of straight lines, $y = mx + b$, $y - y_1 = m(x - x_1)$
- Sketching Quadratic Equations of Form $y = f(x) = ax^2 + bx + c$
  - opens up ($a > 0$) or down ($a < 0$)
  - quadratic formula for zeros: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
  - finding vertex $x = -b/(2a)$, $y = f(-b/(2a))$
  - you can also find the vertex (h, k) by completing the square and comparing to the vertex form $y = a(x-h)^2 + k$.
- Functions
  - domain/range
  - vertical asymptotes
  - horizontal asymptotes
  - increasing/decreasing
  - even/odd/neither (algebraic and graphical)
  - end behaviour
- Properties of the 12 Basic Functions
- Average Rate of Change of function f over interval $[a, a+h]$ is $\dfrac{\Delta y}{\Delta x} = \dfrac{f(a+h) - f(a)}{h}$
- Inverse Functions
  - algebraic technique to find inverse function
  - graphical technique to find inverse function
  - cancelation equations
- Algebra of Functions
  - algebraic combinations of functions, such as fg, $f+g$, $f-g$, and f/g and their domains
  - composition of functions (no domain for composition on this test)
- Simple Graphical Transformation of Function $f(x)$, with $c > 1$
  - shift up: $f(x) + c$
  - shift down: $f(x) - c$
  - shift left: $f(x + c)$
  - shift right: $f(x - c)$
  - reflect about x-axis: $-f(x)$
  - reflect about y-axis: $f(-x)$
  - stretch vertically: $cf(x)$
  - compress horizontally: $f(cx)$