

The skill practice questions on this page are *not* to be turned in. Just work them for practice before you begin the problems on the other side.

0.1. Use any technique to find all real solutions to the following quadratic equations.

Give your answers in exact terms. Fractions and square roots in your answers are fine, but don't convert them to decimals.

a. $(x - 3)(2x + 5) = 0$

b. $b^2 + 8b + 15 = 0$

c. $x^2 + 1 = x + 4$

d. $3t^2 + 4t + 1 = 6 - 4t - t^2$

e. $(x + 1)(x + 2) = 12$

f. $x^2 - 4x + 1 = 0$

g. $9z^2 + 2 = 12z - 2$

0.2. Compute both the *net change* and the *average rate of change* in f over the given interval.

a. $f(x) = 4x + \frac{1}{2}$ over the interval $[-2, 1]$

b. $f(x) = x^3 - 3x - 3$ over the interval $[0, 10]$

c. $f(x) = 2x^2 - x$ over the interval $[2, a]$ (express your answers in terms of a).

d. $f(x) = x^2 - 2x - 2$ over the interval $[a, b]$ (express your answers in terms of a and b).

0.3 Write an equation for the line described in each part.

(Note that it says, "Write an equation", not just find the slope.)

a. The line with slope 6 passing through $(0, -3)$.

b. The line passing through $(-2, 1)$ and $(3, -4)$.

c. The line with slope -9.1 and x -intercept -6.3 .

0.4 Write the equation for the *secant line* through the points $(a, f(a))$ and $(b, f(b))$.

Use the technology of your choice to graph the function f together with the secant line.

a. $f(x) = 5x - 2x^2$, $a = -7$, $b = 3$

b. $f(x) = \frac{3}{1+x}$, $a = 2$, $b = 6$

The following problem is to be turned in. You may work alone or in a group of two; if you work in a pair, submit just one solution write-up with both names on it. You're welcome to ask for help or hints in office hours. If you ask the calculus tutors for help, they will expect to see your solutions to the skill exercises on the previous page first.

Write a final draft of your solutions on clean paper (without ragged edges), leave me a generous amount of space around each problem to write comments, and staple multiple pages. Due at the beginning of class Monday, September 19th.

- (20 pt) 1. A function f is defined by the formula $f(x) = x^2 + x + 1$.
- Find the value of b if the net change in $f(x)$ over the interval $[1, b]$ is +10 units.
 - Find an example of a different interval over which $f(x)$ has the same net change, +10 units. (State clearly what interval you are giving as your example, and then show a calculation to demonstrate that the net change in $f(x)$ is correct. Many different answers are possible. Give a sentence or two explaining how you found the interval that you are presenting.)
 - Find the value of b if the average rate of change in $f(x)$ over the interval $[0, b]$ is 10.
 - Find another interval with the same average rate of change.
 - Graph the function f , the four points involved in (c) and (d), and the two corresponding secant lines. Use technology to make the graph. You may print out the graph, or make a large, neat copy of it by hand.