

For more information and practice, see the OpenLab blog and the Piazza discussion board!

Instructions: These problems are for you to use to test yourself, **after** you have practiced with the routine homework assignments, to see how ready you are for Test 1. They are not meant as a substitute for regular and diligent practice!

Do the following problems as if you were taking a test: without notes or textbook, and give yourself a time limit as stated at the start of each self-test. At the end of that time, check your answers against the answers which will be posted to the blog and/or Piazza: then review as needed before you repeat the self-test. References for review will also be given

Self-Test 1: allow 50 minutes

- 1) Solve the equation. Leave your answers in the form of rational numbers in lowest terms (that is, not decimals!).

$$|x - 5| = 3$$

- 2) Solve the inequality using the “Test point” method. Give your answers in three forms: as inequalities, in interval form, and draw the graph.

$$|x - 5| \leq 2$$

For problems 3 and 4: Using your graphing calculator, find the root(s) [zero(es)] of the given function which lie in the given interval. Round your answers to three decimal places. You must state which functions on the graphing calculator you used in order to solve the equation and what viewing window you used.

3) $f(x) = x^3 + 2x^2 - 11x - 6$; $[-5, -2]$

4) $f(x) = x^4 + x^3 - 10x^2 - 8x - 16$; $[0, \infty)$

- 5) Find the domain of each of the following functions

a) $f(x) = x^2 - 3x$

b) $f(x) = \sqrt{x - 3}$

c) $f(x) = \frac{x-2}{x+5}$

- 6) Compute and simplify the difference quotient $\frac{f(x+h)-f(x)}{h}$ for the function $f(x) = x^2 - 5x + 9$

Self-Test 2: allow 50 minutes

- 1) Solve the equation. Leave your answers in the form of rational numbers in lowest terms (that is, not decimals!).

$$|4x - 5| = 12$$

- 2) Solve the inequality, using the “Test point” method. Give your answers in three forms: as inequalities, in interval form, and draw the graph.

$$|x + 2| > 2$$

For problems 3 and 4: Using your graphing calculator, find the root(s) [zero(es)] of the given function which lie in the given interval. Round your answers to three decimal places. You must state which functions on the graphing calculator you used in order to solve the equation and what viewing window you used.

3) $f(x) = x^3 + 2x^2 - 11x - 6$; $(0, \infty)$

4) $f(x) = 2x^4 + x^3 - 2x^2 + 6x + 2$; $(-3, -1)$

- 5) A function $A(x)$ is defined as follows:

$$A(x) = \begin{cases} x - 3 & \text{if } x \leq 5 \\ 2x + 1 & \text{if } x > 5 \end{cases}$$

Find each of the following values:

$$A(0) =$$

$$A(5) =$$

$$A(10) =$$

What is the domain of $A(x)$?

- 6) Compute and simplify the difference quotient $\frac{f(x+h)-f(x)}{h}$ for the function $f(x) = 3x - 2x^2$

- 7) The graph of a function $f(x)$ is given.

a) What is the domain of f ?

b) What is the range of f ?

