Part 2. Math Practice Test Equations and Inequalities

This practice test is based off the Alexander College Math Placement Test Study Guide, but is not comprehensive of that study guide. The study guide can be found at https://alexandercollege.ca/admissions-and-registration/placement-testing/. It is highly encouraged you read through the study guide in addition to this test.

Do not use a calculator

1) Solve the following problems:

   a. A farmer has 25 animals. 80% are goats, and the rest are chickens. How many chickens does the farmer have?

   b. A goalie blocks 60% of the 20 shots taken against their net during a game of soccer. How many shots will they need to block in a row to get their percentage above 70%?

2) Solve the following for x

   a. $y = mx + b$ where m and b are unknown constants

b. $x^2 = 9$

c. $y = \frac{x^2+x-2}{x-1}$

3) Solve the following problems:

a. Sketch the graph of $y \leq 3x$ for x

b. Sketch the graph of $\frac{1}{9}x^2 + \frac{1}{9}(y-1)^2 = 1$

c. Sketch the graph of $y \geq \sin(|x|)$

4) Find the number of solutions each of the following quadratic equations has (repeated root, unique roots, or no solution)

a. $x^2 + 2x + 1 = 0$

b. $5x^2 + 6x - 2 = 0$

c. $17x^2 - 9x + 5 = 0$

5) Solve the systems of equations below (may have no solution or infinite solutions). If a single solution exists, plot the graph.

   a. $2x_1 + x_2 = 4$ and $x_1 + \frac{1}{2}x_2 = 2$

   b. $x_1 - x_2 = 2$ and $x_1 + x_2 = 2$

   c. $2x_1 - 2x_2 = 1$ and $x_1 + x_2 = 4$

6) Solve the following problems:

   a. At a mechanics shop, the sum of the cost of an engine check up and the cost of an oil change is $100. The cost of the oil change on its own is $27. What is the cost of the engine check up?

b. A rectangular garden has an area of 16 square metres and a perimeter of 20 metres. What are the dimensions of the garden?

c. The sum of two consecutive numbers, each squared, is 25. What are the numbers?