

Name: \_\_\_\_\_

MATH 101

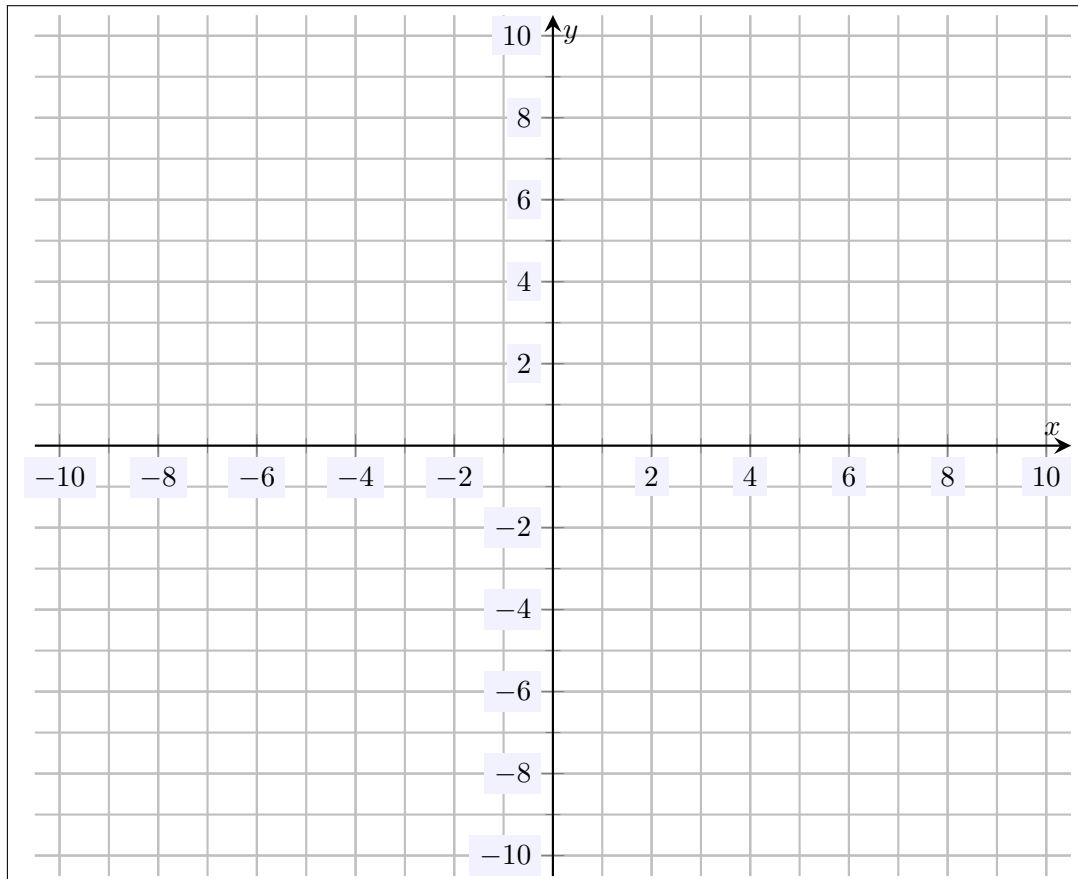
Spring 2022

HW 7: Due 03/03

*"Today is a good day to try."*

*– Quasimodo, The Hunchback  
of Notre Dame*

**Problem 1.** (10pt) Being as accurate as possible, sketch the graph of the line  $2x - 3y = 12$ .



**Problem 2.** (10pt) Consider the linear function  $f(x) = 5 - \frac{3}{4}x$ .

- (a) Find the slope of this linear function.
- (b) Interpret the slope two different ways.
- (c) Is the linear function increasing, decreasing, or constant? Explain.
- (d) Determine the  $y$ -intercept for  $f(x)$ .
- (e) Determine the  $x$ -intercept for  $f(x)$ .

**Problem 3.** (10pt) Showing all your work, find the equation of the line perpendicular to  $y = 5 - 3x$  that passes through the point  $(1, -4)$ .

**Problem 4.** (10pt) Showing all your work, solve the following linear equation, be sure to verify that your solution satisfies the equation:

$$5x - 6 = 1 - 7x$$

**Problem 5.** (10pt) Water is flowing into a ‘rectangular’ box with side lengths 2 ft, 4 ft, and 5 ft at a rate of  $3.4 \text{ ft}^3/\text{min}$ . Currently, the box contains  $16 \text{ ft}^3$  of water. Let  $W(t)$  denote the amount of water in the box  $t$  minutes from now.

- (a) Explain why  $W(t)$  is linear.
- (b) Find  $W(t)$ .
- (c) What do the slope and  $y$ -intercept of  $W(t)$  represent in context?
- (d) Determine when the box will begin to overflow.