

# Math 2001

August 27, 2019

# Homework 2

Read section p2 on coordinates, lines, and increments

1. Consider the points (3,-5) and (-4, 10)

a. Find the slope of the line through the points:  $m = \frac{y_2 - y_1}{x_2 - x_1} =$

b. Find the slope of a line perpendicular to the line through the points:  $m_2 = \frac{-1}{m_1}$

c. Find the equation of the line through the points:  $y = m(x - x_1) + y_1$

HINT: You have the slope in 1a, then also pick one point.

2. Find the equation of the line with slope  $m = \frac{-2}{3}$  with y-axis intercept (0,-9).

HINT:  $y = mx + b$

3. Find the equation of the line with undefined slope which passes through the point (2,7).

HINT: These are vertical lines of the form:  $x = \text{a number}$

4. Find the equation of the line which has slope  $m=0$  and passes through the point (-7,11).

HINT: These are horizontal lines of the form:  $y = \text{a number}$

5. Find the slope and y-axis intercept of the line:  $4x - 7y = 140$

HINT: Solve for y, then:  $y = mx + b$

6. The pressure  $p$  experienced by a diver under water is related to the diver's depth  $h$  by an equation of the form:  $p = kd + 1$  ( $k$  is a constant). At the surface, the pressure is 1 atmosphere.

a. The pressure at 100 meters deep is about 10.94 atmospheres. Use the equation above and find  $k$ . Then, write down the equation using the value of  $k$ .

b. Find the pressure at 50 meters. Use the equation above in 6a.

7. In the FC plane (use F for x and C for y), sketch the graph of the equation

$$C = \frac{5}{9}(F - 32)$$

linking Fahrenheit and Celsius temperatures (example 12 in p2.) On the same graph, sketch the line  $C = F$ . Is there a temperature at which the Fahrenheit thermometer gives the same value as a Celsius thermometer? Find it.

HINT: There are some special points to make plotting easier.

freezing point of water:	32 F	0 C
boiling point of water:	212 F	100 C

8. For what value of k is the line  $2x + ky = 3$  perpendicular to the line  $4x + y = 1$  ?

9. The midpoint of the line segment between the points  $(x_1, y_1)$  and  $(x_2, y_2)$  is

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Find the mid point of the line segment between the points (3.97, -12,8) and (77.1, 102,6) .