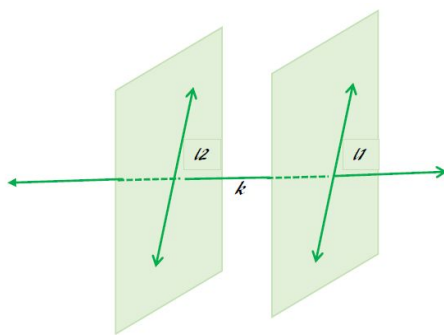


SchoolNova, Math 5b  
Homework 15  
Parallel and Perpendicular Lines  
March 3, 2019

Please provide sufficient details about how you solved the problem. More difficult problems are marked with a \*. If unable to solve a problem, please present your thoughts and any partial solution.

**In this homework, please use graph paper for drawing on the coordinate plane.**

1. It is given that  $l_1 \perp k$  and  $l_2 \perp k$ . A student reasons that lines  $l_1$  and  $l_2$  must be parallel. What is wrong with the reasoning? Sketch a counterexample to support your answer.



2. Find the slope of the line that passes through the points  $P_1(0,6)$  and  $P_2(5,2)$ . The **slope** of a line through points  $P_1(x_1, y_1)$  and  $P_2(x_2, y_2)$  is given by

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

3. Find the slope of the line that passes through the points  $P_1(0,0)$  and  $P_2(3,4)$ .
4. Line  $l_1$  passes through the points  $(1,1)$  and  $(3,5)$ . Line  $l_2$  passes through the points  $(1,1)$  and  $(3,5)$ . Draw both lines on the coordinate plane. Calculate the slopes of both lines. Are the two lines parallel?
5. Write the equation of the line which passes through a point  $(2,3)$  and has a slope of 5, in the **slope-intercept form**. The slope-intercept form of a line with slope  $m$  and y-intercept  $b$  is given by:

$$y = mx + b$$

6. (a) Find the equation of a line  $l_1$  which passes through points  $P_1(3, 1)$  and  $P_2(0, 7)$ , in the slope-intercept form.
- (b) Find a line  $l_2$  that is parallel to  $l_1$  and passes through the point  $P_3(4, 2)$ .
- (c) Draw both lines on the coordinate plane.
7. (a) Given below are the equations of two lines  $l_1$  and  $l_2$ . Determine if the two lines are perpendicular. (Two lines are perpendicular if the product of their slopes is  $-1$ .)

$$l_1 : y = 2x + 3$$

$$l_2 : y = \frac{-1}{2}x + 4$$

- (b) Draw both lines on the coordinate plane.

8. Given below are the equations of two lines  $j_1$  and  $j_2$ . Determine if the two lines are perpendicular.

$$j_1 : y = \frac{3}{4}x + 2$$

$$j_2 : y = \frac{-4}{3}x - 2$$

9. \* Given below are the equations of two lines  $k_1$  and  $k_2$ . Determine if the two lines are perpendicular.

$$k_1 : 4x + 5y = 2$$

$$k_2 : 5x + 4y = 3$$

