



vector  $CP = [-5, -2]$   
or  $[5, 2]$

points, and then I found the vector  $AB$  by counting on the graph left 5 and up 2.

$[-5, 2]$  This worked out because A and B are lattice points. I could have found slope by using slope formula  $(\frac{y_2 - y_1}{x_2 - x_1})$  which would give me  $\frac{2}{-5}$ , and then reversed it to get  $-5$  the vector  $[-5, 2]$ .

Now I knew that I had to make vector  $CP$  perpendicular to  $[-5, 2]$ , so I found the slope of  $AB$ , which was (as previously stated)  $\frac{2}{-5}$ . In order to find the perpendicular  $-5$  line I found the negative reciprocal slope:  $\frac{5}{2}$ .

Then I applied the new slope to point C. I used the negative version of the slope  $-\frac{5}{2}$ , and found point  $P = (2, -2)$ . I also realize I could use the positive form of the slope,  $\frac{5}{2}$ , and find point P to equal  $(6, 8)$ . Both points succeed in making vectors  $AB$  and  $CP$  perpendicular. I know because I formed a perpendicular line  $CP$ .

This problem seems related to pg 16 #9. In that problem, we were given points A and B and had to find two points that formed a line P which made  $ABP$  a right angle. Since perpendicular lines make  $90^\circ$  angles, we had to find the slope of  $AB$  and then find the negative reciprocal of that to form line P, thus creating a perpendicular line P and a right angle  $ABP$ .

$$\text{slope of } \vec{AB} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 1}{1 - 6} = \frac{2}{-5}$$

Negative reciprocal slope =  $\frac{5}{2}$  or  $-\frac{5}{2}$   
(they are the same)

Point C = (4, 3)

add slope  $-\frac{5}{2}$

$$4 - 2 = 2, \quad 3 - 5 = -2$$

(2, -2) = Point P

OR add slope  $\frac{5}{2}$

$$4 + 2 = 6, \quad 3 + 5 = 8$$

(6, 8) = Point P

The general rule that I learned is to look for and use the negative reciprocal slope of a line when trying to find the line perpendicular to it. For example: line x has a slope of  $\frac{1}{2}$ . To find line y perpendicular to line x, I use the negative reciprocal slope of line x,  $-2$ .

How do you make it a vector though?