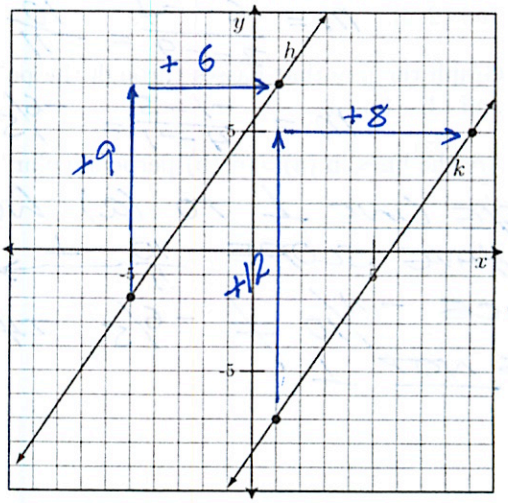
3.5 More Notes

1. Are the lines h and k graphed below parallel? Explain.

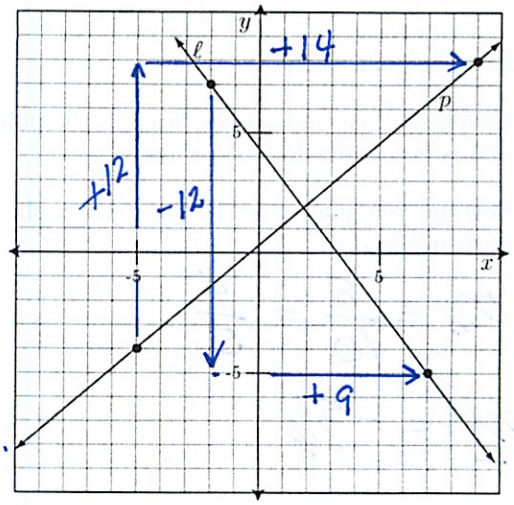


$m_h = \frac{9}{6} = \frac{3}{2}$

$m_k = \frac{12}{8} = \frac{3}{2}$

} SLOPES THE SAME SO LINES $\parallel$.

2. Are the lines ℓ and p graphed below perpendicular? Explain.



$m_\ell = \frac{-12}{9} = -\frac{4}{3}$

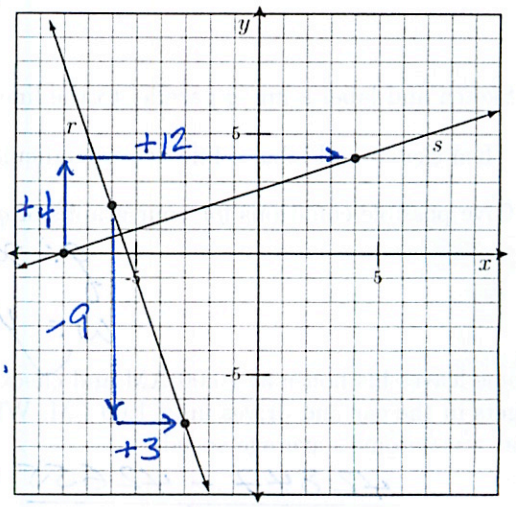
$m_p = \frac{12}{14} = \frac{6}{7}$

THE LINE $\perp$ TO ℓ WOULD HAVE A SLOPE OF $-4/3 \xrightarrow{\perp} 3/4$

SINCE $6/7 \neq 3/4$ THE LINES AREN'T $\perp$.

OR SINCE $-4/3 \times 6/7 = -24/21 \neq -1 \rightarrow$ NOT $\perp$

3. Are the lines r and s graphed below perpendicular? Explain.



$m_r = \frac{-9}{3} = -3/1$

$m_s = \frac{4}{12} = \frac{1}{3}$

SINCE $-3/1$ AND $\frac{1}{3}$ ARE OPPOSITE AND RECIPROCAL, r AND s ARE $\perp$.

OR $-\frac{3}{1} \times \frac{1}{3} = -1$ SO $s \nparallel r$ ARE $\perp$.

4. Suppose line f has the table below.

x	-5	-2	1	4	7
y	11	4	-3	-10	-17

+3 +3 +3

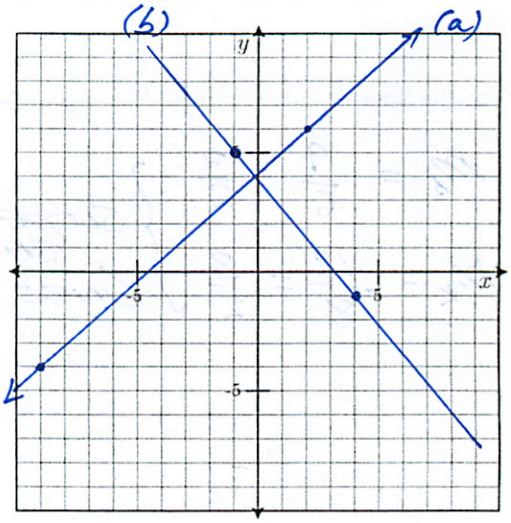
-7 -7 -7

$m_f = -7/3 \xrightarrow{\perp} m_g = +3/7$

If line g is perpendicular to f, complete the table below for g.

x	-16	-9	-2	5	12
y	-1	2	5	8	11

5. Use the graph shown on the right to do the following.



(a) Graph the line that passes through the points $(-9,-4)$ and $(2,6)$. $m = \frac{6-4}{2--9} = \frac{10}{11}$

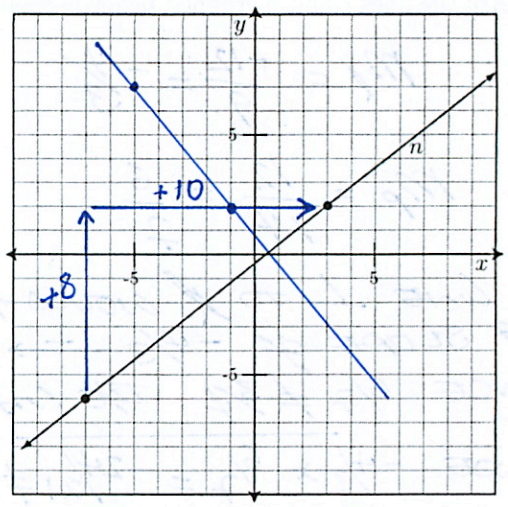
(b) Graph the line that passes through the points $(-1,5)$ and $(4,-1)$. $m = \frac{-1-5}{4--1} = -6/5$

(c) Are the lines in (a) and (b) perpendicular? Explain.

THE LINE $\perp$ TO (a) WOULD HAVE SLOPE $\frac{10}{11} \perp \rightarrow -11/10$

SINCE $-11/10 \neq -6/5$ THE LINES ARE NOT $\perp$!

6. Use the graph shown on the right to do the following.



(a) Plot the point $(-5,7)$.

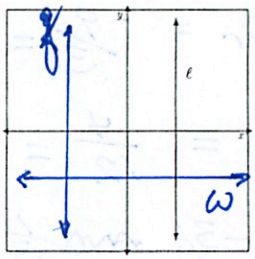
(b) Graph the line that passes through the point $(-5,7)$ and is perpendicular to the line n.

(c) How did you guarantee the line you graphed was perpendicular to n?

$m_n = \frac{8}{10} = \frac{4}{5}$

$m_\perp = -5/4$

7. (a) Sketch and label a line q parallel to the line, ℓ graphed to the right.



(b) Then sketch and label a line w perpendicular to ℓ.

(c) Give possible equations for your graphs of q and w.

$q: x = -5$

$w: y = -4$

8. Jerome leaves his house at 10:00 AM and checks the odometer on his car which reads 42,655 miles. He gets in the car and drives until 1:00 PM. When he checks the odometer again it now reads 42,847 miles. What was Jerome's average speed?

$\frac{42847 - 42655}{3\text{ hrs}} = \frac{192\text{ mi}}{3\text{ hrs}} = 64\text{ mph}.$

9. Alice gets in a cab and tells the cab driver where to take her. She notices the meter in front and sees that after they have driven 3 miles, she owes \$8.10. Later she sees that after they have driven 7 miles, she owes \$15.30. How much is Alice getting charged per mile?

$\frac{15.30 - 8.10}{7-3} = \frac{7.20}{4} = \$1.80/\text{mi}$