Parallel & Perpendicular Lines

Date:

Using the points given below, determine the slope of the line passing through the points, and determine which pairs of lines are parallel and which pairs are perpendicular.

Notation: If AB is parallel to CD, we write AB || CD.

If AB is perpendicular to CD, we write AB ⊥ CD.

Recall: Slope: $m_{AB} = \frac{y_B - y_A}{x_B - x_A}$ OR $m = \frac{y_2 - y_1}{x_2 - x_1}$

(x_1, y_1)	(x_2, y_2)	Slope (Steps)	Slope
A (–4,7)	B (5,8)	$m_{AB} = \frac{8-7}{5-(-4)} = \frac{1}{5+4}$	$\frac{1}{9}$
C (–4,4)	D (–1,5)	$m_{CD} = \frac{5-4}{-1-(-4)} = \frac{1}{-1+4} = \frac{1}{3}$	$\frac{1}{3}$ ↘
E (1,10)	F (2,7)	$m_{EF} = \frac{7-10}{2-1} = \frac{-3}{1}$	-3 ↘
G (7,–4)	H (10,2)	$m_{GH} = \frac{2-(-4)}{10-7} = \frac{2+4}{3} = \frac{6}{3} = 2$	2 ↘
I (6,12)	J (9,9)	$m_{IJ} = \frac{9-12}{9-6} = \frac{-3}{3} = -1$	-1 ↘
K (2,1)	L (6,2)	$m_{KL} = \frac{2-1}{6-2} = \frac{1}{4}$	$\frac{1}{4}$
M (–3,–3)	N (–2,–1)	$m_{MN} = \frac{-1-(-3)}{-2-(-3)} = \frac{-1+3}{-2+3} = \frac{2}{1}$	2 ↘
O (–1,–4)	P (4,–6)	$m_{OP} = \frac{-6-(-4)}{4-(-1)} = \frac{-6+4}{4+1} = \frac{-2}{5}$	$-\frac{2}{5}$ ↘
Q (–8,6)	R (–4,10)	$m_{QR} = \frac{10-6}{-4-(-8)} = \frac{4}{-4+8} = \frac{4}{4}$	1 ↘
S (–5,2)	T (0,0)	$m_{ST} = \frac{0-2}{0-(-5)} = \frac{-2}{0+5} = -\frac{2}{5}$	$-\frac{2}{5}$ ↘

From the table above, list any lines that are parallel or perpendicular. Use proper notation.

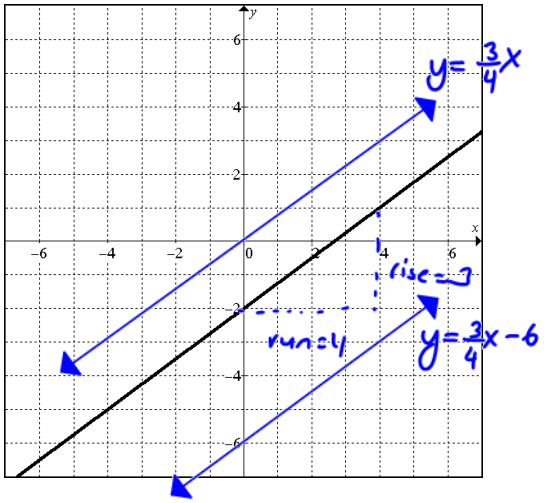
Parallel lines: $\overleftrightarrow{GH} \parallel \overleftrightarrow{MN}$; $\overleftrightarrow{OP} \parallel \overleftrightarrow{ST}$

Perpendicular lines: $\overleftrightarrow{CD} \perp \overleftrightarrow{EF}$; $\overleftrightarrow{IJ} \perp \overleftrightarrow{QR}$

Parallel & Perpendicular Lines

Date:

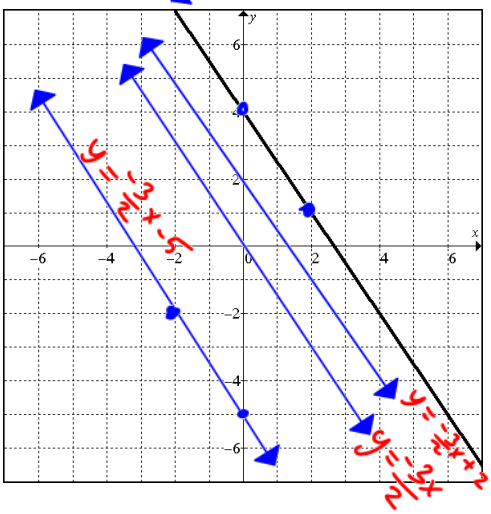
1. State the equation of the line shown on the Cartesian Plane given: $y = \frac{3}{4}x - 2$



   a) Draw 3 lines that are parallel to the given line having y-intercepts of -6, 0 and 4.

   b) Label each of the lines you have drawn with their respective equations.

2. State the equation of the line shown on the Cartesian Plane given: $y = -\frac{3}{2}x + 4$ $y=mx+b$



   a) Draw 3 lines that are perpendicular to the given line having y-intercepts of -5, 0 and 2.

   b) Label each of the lines you have drawn with their respective equations.

3. Beside each of the lines below, give its slope. Hint: "*x*-int" in the questions below is short for "*x*-intercept". *Work for these questions may be done on scrap paper.*

   a) The line $y = -2x - 1$ -2

   b) The line through (2,4) and (4,5) $\frac{5-4}{4-2} = \frac{1}{2}$

   c) The line with *x*-int 5 and *y*-int 3 $-\frac{3}{5}$

   d) The line parallel to $y = 7 - \frac{3}{5}x$ $-\frac{3}{5}$

   e) The line with rise of 5 and run of 2 $\frac{5}{2}$

   f) The line $y = x + 1$ 1

   g) The line through $(-3,1)$ and $(1,5)$ $\frac{5-1}{1+3} = \frac{4}{4} = 1$

   h) The line $y = \frac{2}{3}x + 5$ $\frac{2}{3}$

   i) The line with rise of -2 and run 3 $-\frac{2}{3}$

   j) The line $\perp$ to $y = -\frac{3}{4}x - 1$ ① flip ② change sign $a = \frac{4}{3}$

   k) The line through $(4,-4)$ and $(2,-7)$ $\frac{-7+4}{2-4} = \frac{-3}{-2} = \frac{3}{2}$

   l) The line with *x*-int -2 and *y*-int -1 $-\frac{1}{2}$

In the space provided, list all pairs of lines from #3 above which are either parallel or perpendicular.

Parallel lines: c || d ; f || g

Perpendicular lines: i ⊥ k ; a ⊥ b

Answers:

-2 ; $\frac{1}{2}$; $-\frac{3}{5}$; $-\frac{3}{5}$; $\frac{5}{2}$; 1 ; 1 ; $\frac{2}{3}$; $-\frac{2}{3}$; $\frac{4}{3}$; $\frac{3}{2}$; $-\frac{1}{2}$

c || d ; f || g ; a ⊥ b ; i ⊥ k