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

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

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.
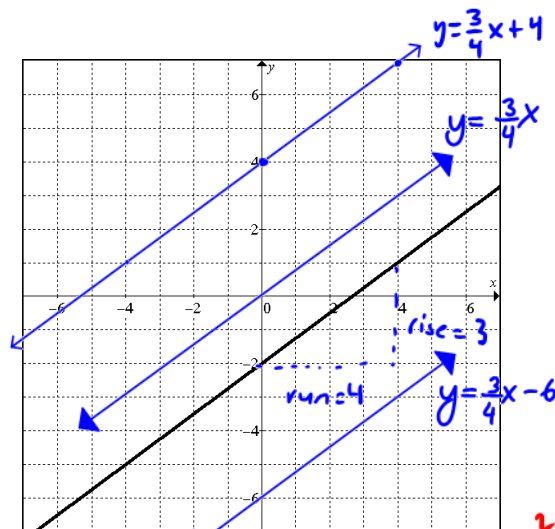
   (Graph annotations: $y = \frac{3}{4}x + 4$; $y = \frac{3}{4}x$; $rise = 3$; $run = 4$; $y = \frac{3}{4}x - 6$)

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

   (annotation: $y = mx + b$; perpendicular slope $= \frac{2}{3}$)

   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.

   (Graph annotations: $y = \frac{2}{3}x + 2$; $y = \frac{2}{3}x$; $y = \frac{2}{3}x - 5$)
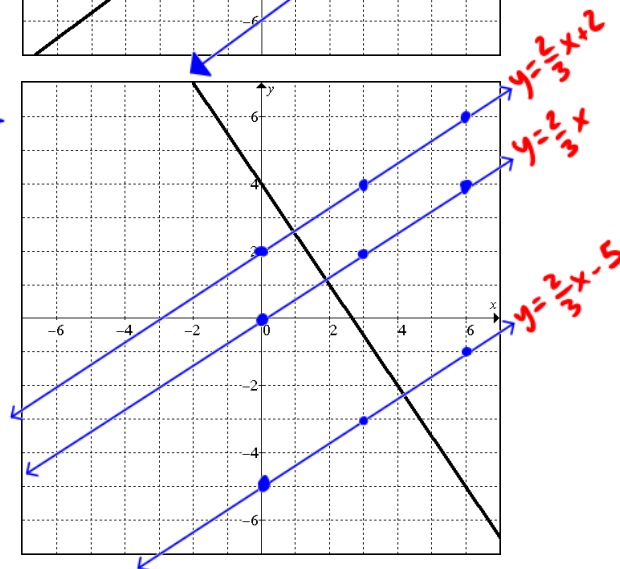
3. Beside each of the lines below, give its slope. Hint: "*x*-int" in the questions below is short for "*x*-intercept". *Work for these questions may be done on scrap paper.*

   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 $-3/5$

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

   e) The line with rise of 5 and run of 2 $5/2$

   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 $y = \frac{2}{3}x + 5$ $2/3$

   i) The line with rise of -2 and run 3 $-2/3$

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

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

   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