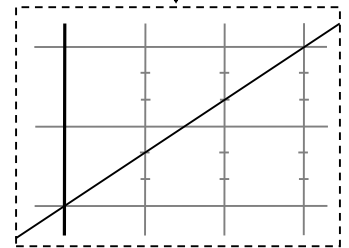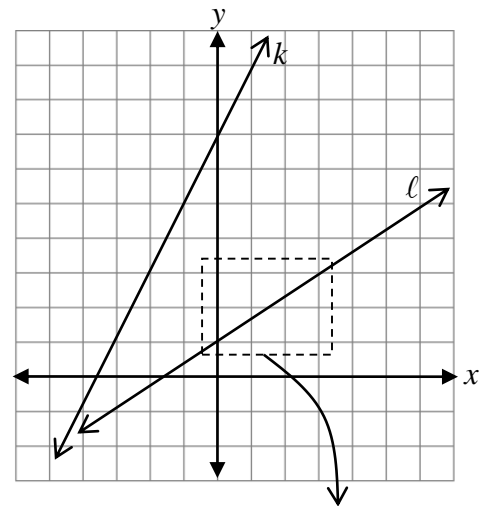**Geometry Notes CG - 3: Parallel and Perpendicular Lines**

Slope, Again

Ex: Two lines, k and ℓ, are graphed at right.

    a. What is the slope of line k?

    b. As you travel left to right along line k, how does y change each time x increases by 1 unit?

    c. What is the slope of line ℓ?

    d. As you travel left to right along line ℓ, how does y change each time x increases by 1 unit?
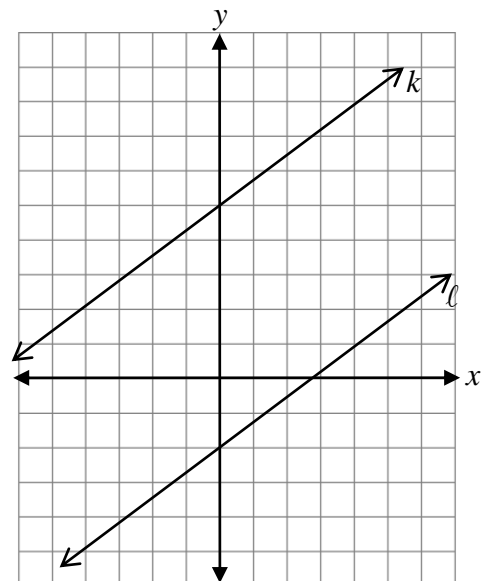
Fact: For a (non-vertical) line with slope m, each time x increases by 1 unit,

Ex: For the line $7x + 4y = 12$, what happens to y each time x increases by 1 unit?

Parallel and Perpendicular Lines

Ex: The diagram at right shows two lines, ℓ and k.

    a. Find their slopes.

    b. Will the lines ever intersect?

    c. Draw line n perpendicular to line ℓ at the point (4, 1).
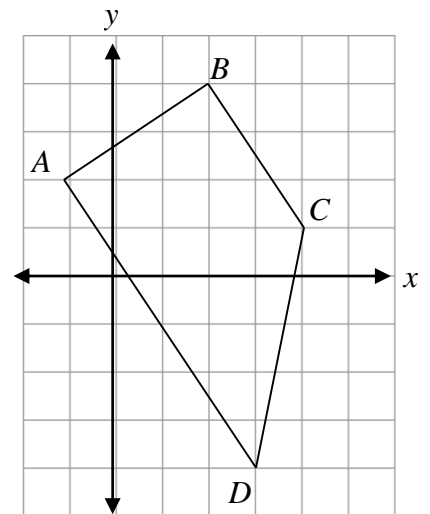
    d. What is the slope of line n?

Important Facts: 1. || segments have

   2. ⊥ segments have

Ex: If $\overline{AB} \perp \overline{BC}$ and the slope of $\overline{AB}$ is $-\dfrac{3}{4}$, what is the slope of $\overline{BC}$?

Ex: Quadrilateral *ABCD* has vertices $A(-1, 2)$, $B(2, 4)$, $C(4, 1)$ and $D(3, -4)$.

   a. Is $\overline{AD} \parallel \overline{BC}$?
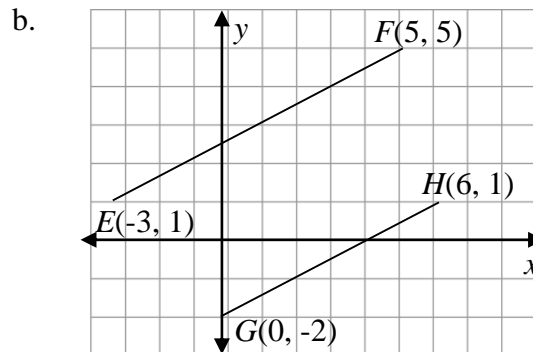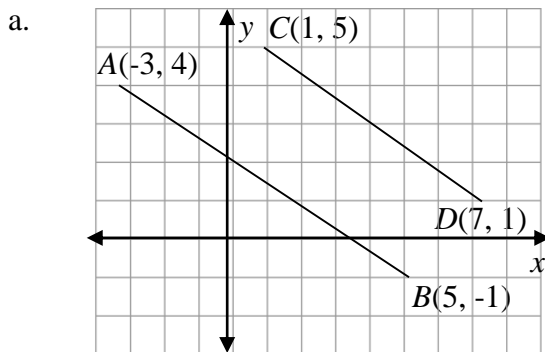
   b. Is $\angle A$ a right angle?

Geometry HW: CG - 3

1. a. Find the slope of the line $3x - 4y = 8$.

    b. Find the slope of a line parallel to the line in part *a*.

    c. Find the slope of a line perpendicular to the line in part *a*.

2. Determine using slopes whether or not the two segments shown are parallel and give a specific reason why or why not.

  a.

  b.

3. In the quadrilateral at right, determine using slopes if $\angle A$ and/or $\angle D$ are right angles. For each angle, give a specific reason why or why not.
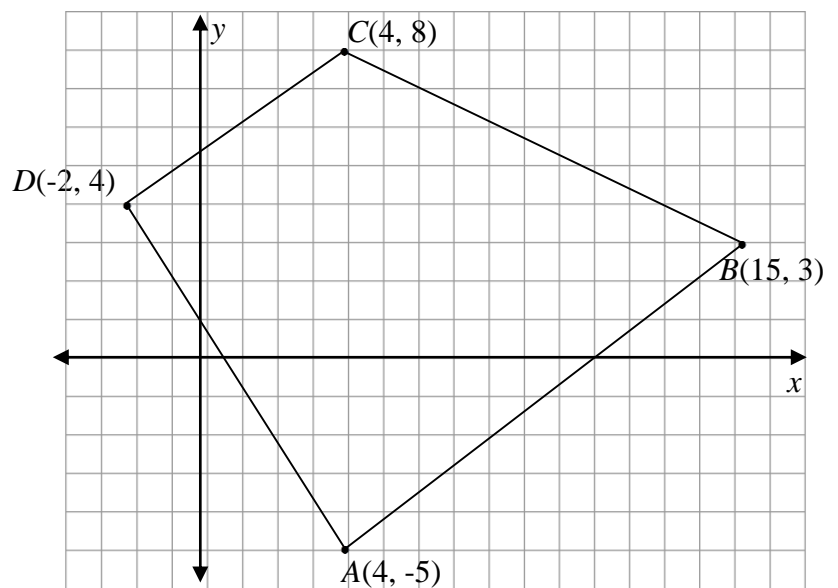
4. Find the equation of a line parallel to the line $3x + 2y = 12$ and passing through the point $(6, -2)$.

5. Find the equation of a line perpendicular to the line $y = \dfrac{5}{2}x + 3$ and passing through the point $(5, -4)$.

6. Two perpendicular lines have the same y-intercept. The equation of one of the lines is $2x + 3y = 12$. Find an equation for the other line.

7. Tom has a line of slope 2/3. Sawyer has a line parallel to Tom's with a slope of p/q. Must $p = 2$? Explain.

8. Triangle ABC has vertices $A(-2, 3)$, $B(6, 3)$ and $C(6, 9)$.
   a. Graph $\triangle ABC$.
   b. Find the area of the triangle.
   c. Find the perimeter of the triangle.