1. (10 points) Find an equation of a line that goes through the points \((1, 2)\) and \((2, 6)\). Express your line in slope-intercept form. What are the intercepts of this line?

We find the slope by 
\[
 m = \frac{\text{rise}}{\text{run}} = \frac{6 - 2}{2 - 1} = 4.
\]
Now use the point slope formula to get \(y - 2 = 4(x - 1)\) or 
\(y - 6 = 4(x - 2)\) depending on which point you use. Doing some algebra we get slope intercept form of \(y = mx + b\) by solving for \(y\). They both end up simplifying to \(y = 4x - 2\).

To find the \(x\)-ints we set \(y = 0\) and solve 
\[
 0 = 4x - 2 \Rightarrow x = \frac{1}{2},
\]
so \(\frac{1}{2}\) is our \(x\)-int.

To find the \(y\)-ints we set \(x = 0\) and get 
\[
 y = 0 - 2 = -2,
\]
thus the \(y\)-int is \(-2\).

2. (10 points) Consider the two lines \(L_1: 2x + 5y = 4\) and \(L_2: -5x + 2y = 8\). Are the lines perpendicular, parallel or neither. Make sure to justify your answer.

First we get both lines into slope-intercept form so they are easy to compare.

\[
 L_1 : 5y = -2x + 4 \Rightarrow y = -\frac{2}{5}x + \frac{4}{5}, \text{ so it has slope } \frac{-2}{5}.
\]

\[
 L_2 : 2y = 5x + 8 \Rightarrow y = \frac{5}{2}x + 4, \text{ so it has slope } \frac{5}{2}.
\]

The product of the slopes is \(-1\) so the lines are perpendicular.

3. (Bonus +2) To what class does the narrator of Flatland belong, i.e. what shape is he?

A square.