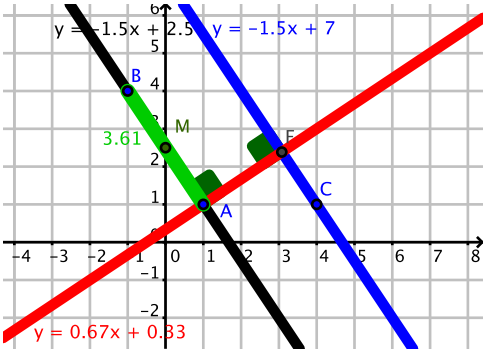
# Coordinate geometry review

All of the facts below are shown on the figure.




1. Slope of a line between two points $(x_1, y_1)$ and $(x_2, y_2)$ is $\frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$. What is the slope of $\overline{AB}$ in the figure? Write it as a fraction and compare with the decimal shown on the figure as $m$ in the equation $y = mx + b$. (The decimals are only approximate.)

2. Parallel lines have the same slope. What is the slope of $\overline{FC}$?

3. Perpendicular lines have opposite reciprocal slopes. For example, a line perpendicular to a line with a slope of $-2$ would have a slope of $\frac{1}{2}$, and a line perpendicular to a line with slope of $\frac{2}{3}$ has slope of $-\frac{3}{2}$. What is the slope of $\overline{AF}$? Convert those fractions to decimal and compare with the equation for that line.

4. The midpoint of a line segment is the point whose coordinates are the *averages* of the $x$ and $y$ coordinates of the endpoints of the segment. So the midpoint of the segment connecting two points $(x_1, y_1)$ and $(x_2, y_2)$ is $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$. Find the midpoint of $\overline{AB}$. Does that match the coordinates of point $M$?

5. To find the distance between two points $(x_1, y_1)$ and $(x_2, y_2)$ you can use the distance formula: distance $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. Notice that if the two points are not on either the same horizontal or the same vertical line, this is the Pythagorean Theorem, and if they are on the same horizontal or vertical line, it becomes much simpler. Show how applying this formula to the distance between $A$ and $B$ gives a number for which the 3.61 in the figure is an approximation.