1. (3pts) Find the slope of the line containing the points (4,-9) and (-5,6).

Let \( m \) denote the slope of the line containing the given points.

\[
 m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - (-9)}{-5 - 4} = \frac{15}{-9} = -\frac{5}{3}
\]

2. (3pts) Graph the linear equation \( 5x + 2y = 6 \) and determine its slope, if it exists.

We first write the expression

\[
5x + 2y = 6 \quad \rightarrow \quad 2y = -5x + 6
\]

\[
\rightarrow \quad y = -\frac{5}{2}x + 3
\]

The slope of the equation is \(-\frac{5}{2}\).

3. (3pts) The number of visits to the public libraries increased from 1.1 billion in 1998 to 1.3 billion in 2003. Find the average rate of change in the number of public library visits from 1998 to 2003. (Include the proper units to get full credit.)

The average rate of change is the slope of the line connecting the two given points. Let \( m \) be the average rate of change. Then

\[
m = \frac{1.3 - 1.1}{2003 - 1998} = \frac{0.2}{5} = 0.04 \text{ billion visits per year.}
\]

There is an average increase of 40 million visits per year between 1998 and 2003.

4. (3pts) Find the equation for a line that passes through the points (0,−6) and (3,−4).

First find the slope of the line. Thus, if \( m \) denotes the lines slope

\[
m = \frac{-4 - (-6)}{3 - 0} = \frac{2}{3}
\]

Using the point slope form of a line:

\[
m = \frac{y - y_1}{x - x_1} \quad \Rightarrow \quad \frac{2}{3} = \frac{y - (-6)}{x - 0} \quad \Rightarrow \quad y = \frac{2}{3}x - 6
\]

5. (2pts) Determine whether the given pair of lines is perpendicular, parallel or neither.

• \( y = -x + 7 \) and \( y = x + 3 \) The slope have product -1 \( \rightarrow \) they are perpendicular.
• \( x = -3 \) and \( y = 4 \) Vertical line and a horizontal line \( \rightarrow \) they are perpendicular.