1. Are the following lines parallel, perpendicular, or neither?

a. 3y = 5x - 1 and -3x = 5y - 4

$y = \frac{5}{3}x - \frac{1}{3};$ $y = -\frac{3}{5}x + \frac{4}{5}$

Perpendicular

b. 2y + 2 = -3x and 3x − 2y = 8

$y = -\frac{3}{2}x - 1;$ $y = \frac{3}{2}x - 4$

Neither

2. What is the slope of the line:

a. perpendicular to: y - 7 = 2x

$y = 2x + 7$

$\perp so\ m = -\frac{1}{2}$

b. parallel to: 4y - 1 = -x

$y = -\frac{1}{4}x + \frac{1}{4}$

$|| so\ m = -\frac{1}{4}$

3. Given that A(3, 5) and B(7, -9), find:

   a. the length of $\overline{AB}$

$d = \sqrt{(7 - 3)^2 + (-9 - 5)^2}$

$= \sqrt{4^2 + (-14)^2} = \sqrt{212}$

   b. the slope between A and B.

$m = \frac{-9-5}{7-3} = \frac{-14}{4} = \frac{-7}{2}$

   c. the midpoint of $\overline{AB}$.

$M = \left(\frac{3+7}{2}, \frac{5+-9}{2}\right) = \left(\frac{10}{2}, \frac{-4}{2}\right) = (5, -2)$