Math 5a Solutions to Worksheet on Sections 1.8 and 1.10

1. (a) \( x^2 + \frac{y^2}{4} = 1 \)
   - \( x \)-intercept(s): \( x^2 + 0^2 = 1 \) \( \Rightarrow \) \( x^2 = 1 \) \( \Rightarrow \) \( x = \pm 1. \)
   - \( y \)-intercept(s): \( 0^2 + \frac{y^2}{4} = 1 \) \( \Rightarrow \) \( \frac{y^2}{4} = 1 \) \( \Rightarrow \) \( y^2 = 4 \) \( \Rightarrow \) \( y = \pm 2. \)

(b) \( y = \frac{x^2 - 9}{x + 2} \)
   - \( x \)-intercept(s): \( \frac{x^2 - 9}{x + 2} = 0 \) \( \Rightarrow \) \( x = \pm 3. \)
   - \( y \)-intercept(s): \( y = \frac{0^2 - 9}{0 + 2} \) \( \Rightarrow \) \( y = -\frac{9}{2}. \)

2. b \( \leftrightarrow \) Line 1; \ a \( \leftrightarrow \) Line 2; \ d \( \leftrightarrow \) Line 3; \ e \( \leftrightarrow \) Line 4; \ c \( \leftrightarrow \) Line 5.

3. \( m = \frac{-5 - 3}{4 - (-2)} = \frac{-8}{6} = -\frac{4}{3}. \)
   - (a) point-slope form: \( y - 3 = -\frac{4}{3}(x + 2) \) or \( y + 5 = -\frac{4}{3}(x - 4). \)
   - (b) slope-intercept: we can take \( y - 3 = -\frac{4}{3}(x + 2) \) and solve for \( y \), getting \( y = -\frac{4}{3}x + \frac{1}{3}. \)

4. (a) The line \( y + 2x = 1 \) can be written as \( y = -2x + 1 \) so it has slope \(-2. \) A line perpendicular to it has slope \( \frac{1}{2}. \) So the equation of \( L \) is \( y - 1 = \frac{1}{2}(x + 1). \) When we write this in slope-intercept form, we get \( y = \frac{1}{2}x + \frac{3}{2}. \)

(b) Graph of both lines:

5. The horizontal line that passes through the point \((3, -2)\) has equation \( y = -2. \) Its slope is 0.

6. The vertical line that passes through the point \((4, -3)\) has equation \( x = 4. \) Its slope is undefined.