2.5 # 13 and 15.

Formulas you need to know:

Slope of a line:

$$m = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$$

Point-slope form of a line:

$$y - y_1 = m(x - x_1)$$

13. Find an equation of the line through (-1,3) and (3,4)

- Find the slope
- Use the slope and one of the points in the point-slope form of the line
- Simplify the equation to the standard form

$$m = \frac{rise}{run} = \frac{4-3}{3-(-1)} = \frac{1}{3+1} = \frac{1}{4}$$

Line equation:

$$y - 3 = \frac{1}{4}(x - (-1))$$

$$y - 3 = \frac{1}{4}(x + 1)$$

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

To get standard form, multiply to get rid of fractions (optional), and then add and subtract to get the x and y terms on the left, and the constant on the right.

$$\frac{4}{1} \cdot (y - 3) = \frac{4}{1} \cdot \left(\frac{1}{4}x + \frac{1}{4}\right)$$

$$4y - 12 = \frac{4}{1} \cdot \frac{1}{4}x + \frac{4}{1} \cdot \frac{1}{4}$$

$$\begin{array}{l} 4y - 12 \quad = x + 1 \\ \underline{-x \quad +12} \quad \underline{-x \quad +12} \end{array}$$

$$4y - x = 12 + 1$$

$$4y - x = 13$$

14. (2,3), (-1,2)

$m = \frac{rise}{run} = \frac{2-3}{-1-(2)} = \frac{-1}{-3} = \frac{1}{3}$ You can do it in the other order: $m = \frac{rise}{run} = \frac{3-2}{2-(-1)} = \frac{1}{3}$

Line equation

$y-3 = \frac{1}{3}(x-2)$

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

You can do it with the other point:

$y-2 = \frac{1}{3}(x-(-1))$

$y-2 = \frac{1}{3}(x+1)$

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

I'm going to show how to get the standard form after first getting rid of the denominators:

$3\cdot(y-3) = 3\cdot\left(\frac{1}{3}x - \frac{2}{3}\right)$

$3y-9 = \frac{3}{1}\cdot\frac{1}{3}x - \frac{3}{1}\cdot\frac{2}{3}$

$3y-9 = x-2$

or

$3\cdot(y-2) = 3\cdot\left(\frac{1}{3}x + \frac{1}{3}\right)$

$3y-6 = \frac{3}{1}\cdot\frac{1}{3}x + \frac{3}{1}\cdot\frac{1}{3}$

$3y-6 = x+1$

Now add or subtract to get x and y on the left and the constant terms on the right:

$3y-9 = x-2$

$\underline{-x+9} \quad \underline{-x+9}$

$3y-x = 9-2$

$3y-x = 7$

$3y-6 = x+1$

$\underline{-x+6} \quad \underline{-x+6}$

$3y-x = 6+1$

$3y-x = 7$

Notice you get the same answer both ways.

To Find slope and y-intercept and graph each function:

- **Solve for y to get the slope-intercept form: y=mx+b where m is the slope and b is the y-intercept.**
- **Write down the slope and y-intercept**
- **Graph by using the y-intercept and slope to get two points on the line.**
  - **A good first point is the y-intercept point: (0,b)**
  - **Use m=rise/run with the point (0,b) to get a second point: (0+run,b+rise)**

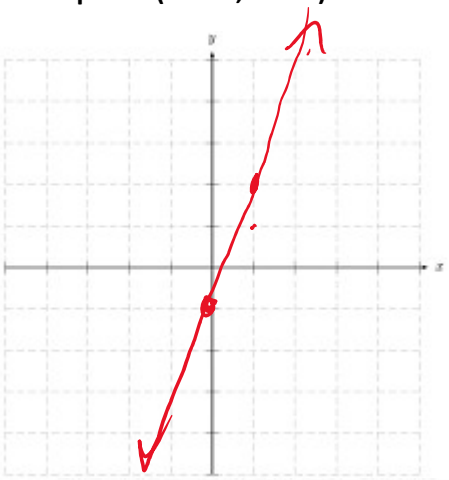
29. $y = 3x - 1$

y-intercept is -1

slope is 3=3/1

Plot the point (0,-1) and the point (0+1,-1+3)=(1,2)

And connect them with a line

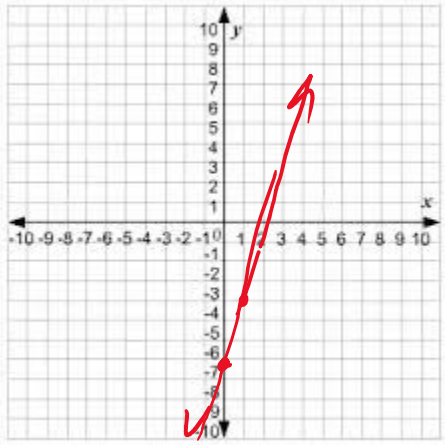


31.

$$4x - y = 7$$
$$\underline{-4x} \qquad \underline{-4x}$$
$$-y = -4x + 7$$
$$-1 \cdot (-y) = -1 \cdot (-4x + 7)$$
$$y = 4x - 7$$

Slope = 4 = 4/1

y-intercept = -7.



Plot the points (0,-7) and (0+1,-7+4)=(1,-3) and connect them with a line

33.

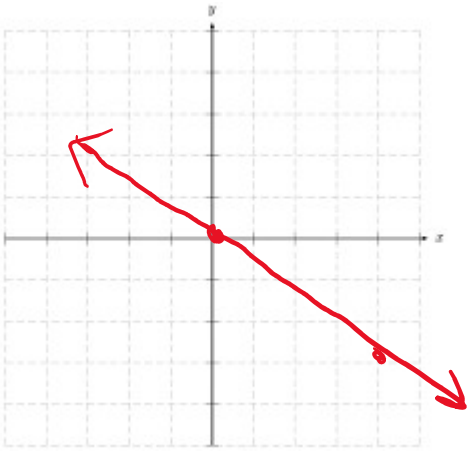
$$\frac{4y}{4}=\frac{-3x}{4}$$

$$y=\frac{-3}{4}x+0$$

Slope = -3/4, y-intercept 0

Plot the points (0,0) and (0+4,0-3)=(4,-3)

Connect the points with a line.



35.

$$x+2y=-4$$
$$\underline{-x} \qquad \underline{-x}$$
$$2y=-x-4$$
$$\frac{2y}{2}=\frac{-x-4}{2}$$
$$y=\frac{-1}{2}x+\frac{-4}{2}$$
$$y=\frac{-1}{2}x+-2$$

Slope = -1/2, y-intercept -2

Plot the points (0,-2) and (0+2,-2-1)=(2,-3)

Connect the points with a line.