Symmetric Form

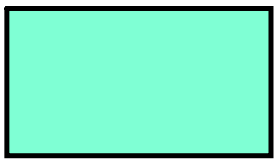
The equation of an oblique line that does not pass through the origin can be written as ...

$$\frac{x}{a}+\frac{y}{b}=1$$

where a is the x-intercept (zero) and b is the y-intercept, and the slope (rate of change) is $\frac{-b}{a}$.

Example: What is the equation of the line whose intercepts are $(5, 0)$ and $(0, -4)$?

Answer:



Example: What is the equation of the line whose x-intercept is $(-12, 0)$ and passes through the point $(6, 10.5)$?

$$\frac{x}{a}+\frac{y}{b}=1 \longrightarrow \frac{6}{-12}+\frac{10.5}{b}=1$$

$$-0.5+\frac{10.5}{b}=1$$

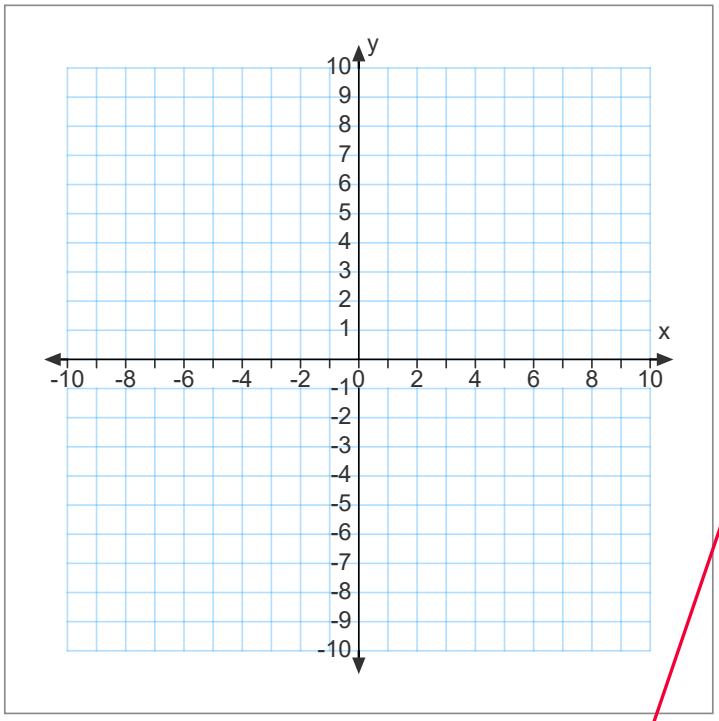
$$\frac{10.5}{b}=1.5$$

$$\frac{10.5}{1.5}=b$$

$$7=b$$

Answer: $\frac{x}{-12}+\frac{y}{7}=1$

Example: Draw the graph of $\frac{x}{2}+\frac{y}{-6}=1.$



Converting From One Form to Another

Example: Determine the equation of the line that passes through the points $(3, 11)$ & $(6, 3)$ in all three forms.

1) Standard $y = mx + b$

2) General $Ax + By + C = 0$

3) Symmetric $\frac{x}{a} + \frac{y}{b} = 1$

What are the intercepts of the line whose equation is $\frac{2x}{3} - \frac{5y}{4} = 1$?

Example: A line's x-intercept is -10 and its y-intercept is 8. Determine the equation of the line three ways.

1) Symmetric

2) Standard

3) General

Example: Write the equation $2x-4y-5=0$ in symmetric form.

Example: Find the equation of a line that passes through the point $(4, 9)$ and is

a) parallel to the line $\frac{x}{2}+\frac{y}{3}=1$.

Example: Find the equation of a line that passes through the point $(4, 9)$ and is

b) perpendicular to the line $\frac{x}{5} - \frac{y}{4} = 1$.

Example: Determine the equation of the perpendicular bisector of the line segment that joins points (5, 8) & (15, 13).