X- and Y-Intercepts of a Straight Line

1. What is the equation of a line with a slope of \(-\frac{1}{3}\) and a y-intercept of 8?

   Equation: _______________________________

2. What is the equation of a line with a slope of \(\frac{2}{3}\) and an x-intercept of \(-12\)?

   Equation: _______________________________
X- and Y-Intercepts of a Straight Line

1. What is the equation of a line with a slope of $-\frac{1}{3}$ and a y-intercept of 8?

   \[ y = \alpha x + b \]

   \[ a = -\frac{1}{3} \approx -0.3 \]

   \[ b = 8 \]

   Equation: \[ y = -0.3x + 8 \]

2. What is the equation of a line with a slope of $\frac{2}{3}$ and an x-intercept of 12?

   \[ y = \alpha x + b \]

   \[ a = \frac{2}{3} \approx 0.6 \]

   \[ x = 12 \]

   \[ y = 0 \]

   \[ 0 = 0.6(12) + b \]

   \[ 0 = 7.2 + b \]

   \[ b = 8 \]

   Equation: \[ y = 0.6x + 8 \]
3. What is the equation of a line with an \textbf{x-intercept} of 16 and a \textbf{y-intercept} of \(-2\)?

Equation: ______________________

4. What are the coordinates of point B?

B (___,___)
3. What is the equation of a line with an x-intercept of 16 and a y-intercept of -2?

Equation: \( y = 0.125x - 2 \)

4. What are the coordinates of point B?

Equation: \( 6y + 21x - 357 = 0 \)

\[ 6y = -21x + 357 \]

\[ y = -3.5x + 59.5 \]

\[ 0 = -3.5x + 59.5 \]

\[ -3.5 \]

\[ x = 17 \]

B (17, 0)
5. What is the **y-intercept** of a line passing through \((-20, -114.75)\) and \((30, 310.25)\)?

\[ \text{Y-intercept \((____, _____)\)} \]

6. What is the **x-intercept** of a line passing through \((-30, 68)\) and \((54, 12)\)?

\[ \text{X-intercept \((____, _____)\)} \]
5. What is the y-intercept of a line passing through \((-20, -114.75)\) and \((30, 310.25)\)?

\[
\begin{align*}
\alpha &= \frac{y_2 - y_1}{x_2 - x_1} = \frac{310.25 - (-114.75)}{30 - (-20)} = \frac{425}{50} = 8.5 \\
y &= a \cdot x + b \\
y &= 8.5 \cdot x + b \\
310.25 &= 8.5 \cdot (30) + b \\
310.25 &= 255 + b \\
55.25 &= b
\end{align*}
\]

Y-intercept \((0, 55.25)\)

6. What is the x-intercept of a line passing through \((-30, 68)\) and \((54, 12)\)?

\[
\begin{align*}
\alpha &= \frac{y_2 - y_1}{x_2 - x_1} = \frac{12 - 68}{54 - (-30)} = \frac{-56}{84} = -0.6667
\end{align*}
\]

\[
\begin{align*}
y &= a \cdot x + b \\
y &= -0.6667 \cdot x + b \\
12 &= -0.6667 \cdot (54) + b \\
12 &= -36 + b \\
48 &= b
\end{align*}
\]

X-intercept \((72, 0)\)
7. Joan gets a job planting trees for the summer. At the beginning of the season, she owes the company she works for $440.00 for food and lodging. She makes $1.25 for every 10 trees she plants. How many trees must Joan plant in order to break even?

8. Kathy wins the lottery and deposits her winnings into a savings account at the bank. She spends $1200 every week. After 150 weeks, she has $360 000 left in the account. How much money did Kathy win initially?
7. Joan gets a job planting trees for the summer. At the beginning of the season, she owes the company she works for $440.00 for food and lodging. She makes $1.25 for every 10 trees she plants. How many trees must Joan plant in order to break even?

\[ x = \text{number of trees planted} \]
\[ y = \text{profit ($)} \]

\[ y = ax + b \]
\[ y = \frac{1.25}{10} x - 440 \]

\[ 0 = \frac{1.25}{10} x - 440 \]
\[ 440 = \frac{1.25}{10} x \]
\[ x = \frac{440 \times 10}{1.25} = 3520 \]

Answer: Joan breaks even after planting 3520 trees.

8. Kathy wins the lottery and deposits her winnings into a savings account at the bank. She spends $1200 every week. After 150 weeks, she has $360 000 left in the account. How much money did Kathy win initially?

\[ x = \text{time (wks.)} \]
\[ y = \text{account balance ($)} \]

\[ y = ax + b \]
\[ y = -1200 x + 540 \ 000 \]

\[ 360 \ 000 = -1200 (150) + b \]
\[ 360 \ 000 = -180000 + b \]
\[ b = 540 \ 000 \]

Answer: Kathy initially won $540 000.