Chapter 2, Sections 2-5 Linear Equations and Functions
I. Solving Linear Equations
Solve algebraically. Check #1 and 2 on your calculator by graphing.

a) \( \frac{1}{2}x - 3 = 2 \)
\[
\frac{1}{2}x = 2 + 3
\]
\[
x = 2 \cdot 2
\]

b) \(-\frac{3}{4}x + \frac{3}{4}x = \frac{9}{4}x - \frac{9}{4}x = 9 - 9 = 0\)
\[
x = -2
\]

b) \(\frac{1}{4}x + \frac{4}{11}x = 7\)
\[
x = 7 \cdot \frac{11}{15}
\]
\[
x = \frac{11}{2}
\]
\[
x = \frac{22}{4}
\]
\[
x = 5
\]

II. Formulas
Solve for the indicated variable.

a) The formula that relates distance, rate, and time is \(D = RT\). Solve for \(R\).
\[
D = \frac{R}{t}
\]
\[
R = \frac{D}{t}
\]

b) The formula for the area of a circle is \(A = \pi r^2\). Solve for \(r\).
\[
A = \pi \frac{r^2}{r^2}
\]
\[
\frac{A}{\pi} = r^2
\]
\[
r = \sqrt{\frac{A}{\pi}}
\]
c.) The formula for the circumference of a circle is \( C = \pi d \). Solve for \( d \).

\[
\frac{C}{\pi} = d
\]

\[ \therefore \frac{C}{\pi} = d \]

d.) \( I = Prt \), for \( t \)

\[ I = \frac{Pr}{1+r} \]

\[ \therefore I = \frac{Pr}{1+r} \]

c.) \( A = P(1 + rt) \)

\[ \frac{A}{1+rt} = P \]

\[ \therefore P = \frac{A}{1+rt} \]

III. Linear Functions

So far, we've looked at functions in general, domain, range, VLT, functional notation, and solving linear equations.

Now, we'll look specifically at linear functions.

One form of a linear function is \( f(x) = mx + b \).

Ex.: \( f(x) = 3x - 2 \)

\[ f(0) = \]

\[ f(x) = \frac{1}{2} x + \sqrt{2} \]

\[ f(0) = \]

\[ f(x) = -5x - \pi \]

\[ f(0) = \]

Therefore, \( b \) is called ______

Therefore, \( b \) is called ______

Graph the following equations on your calculator. Use the standard viewing window.

\[ y = x + 1 \]

\[ y = 4x + 1 \]

\[ y = 6x + 1 \]

All have the same \( y \)-intercept? What's different?

Slope:

\[ \text{slope} = \frac{y_2 - y_1}{x_2 - x_1} \]

Ex.: \( y = 4x + 1 \)

IV. Linear Graphs

Graph the following by finding the intercepts.

\[ a) \ y = 3x + 6 \]

\[ b) \ y = -2x + 5 \]

This graph is said to be ______

This graph is said to be ______

If \( f(x) = mx + b \), \( f(x) \) is said to be in slope-intercept form because__________

Find the slope and \( y \)-intercept for the equation \( 5x - 4y = -8 \).

Write the equation of a line whose slope is \(-2/3\) and \( y \)-intercept is \((0,4)\).
Now we’ll look at a practical example where the intercepts give information.

**Salvage Value**

Tyme Tonic uses the function \( S(t) = -700t + 3500 \) to determine the salvage value \( S(t) \), in dollars, of a photocopier \( t \) years after its purchase.

a.) That does \( t \) represent? What does \( S(0) \) or \( S \) represent? What is salvage value?

\[
S(t) = -700t + 3500
\]

b.) Graph \( S(t) \) by finding the intercepts.

c.) The point ( ) is the \( y \)- or \( S \)-intercept for this graph. Use this point in a sentence explaining what the point means for the company.

d.) The point ( ) is the \( x \)- or \( t \)-intercept for the graph. Use this point in a sentence explaining what the point means for the company.

\[
S(t) = -700t + 3500
\]

e.) \(-700\) is the slope for the graph. What does \(-700\) represent for the company?

f.) What is the practical domain of \( S(t) \)?

What can you say about the slope of parallel lines?

What can you say about the slope of perpendicular lines?