

Student Workbook

Graphs of Linear Functions

Name: _____

Date: _____

Period: _____

Learning Target: I can graph linear functions using slope and intercepts, and determine whether two lines are parallel, perpendicular, or neither.

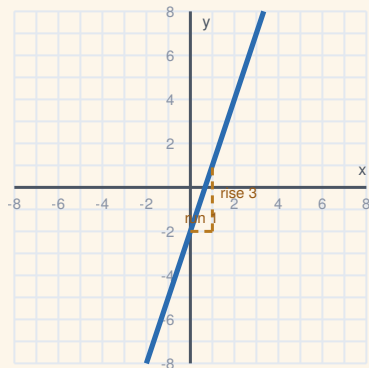
Vocabulary

Term	Meaning
x-intercept	The point where the graph crosses the x-axis (where $f(x)=0$).
y-intercept	The point where the graph crosses the y-axis (where $x=0$).
Parallel Lines	Lines with the SAME slope that never intersect.
Perpendicular Lines	Lines whose slopes are negative reciprocals (multiply to -1); they meet at a right angle.

Key Concept: Graphing Using Slope-Intercept Form

EXAMPLE 1

Graph $f(x) = 3x - 2$: plot the y-intercept $(0,-2)$, then use the slope (rise 3, run 1) to find the next point.



Key Concept: Graphing Using Intercepts

METHOD

x-intercept: set $f(x) = 0$, solve for x . y-intercept: evaluate $f(0)$.

EXAMPLE 2

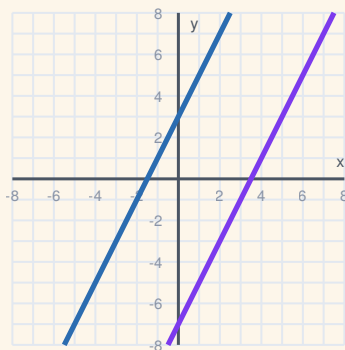
Find the intercepts of $f(x) = 2x - 8$.

x-intercept: $0 = 2x - 8 \rightarrow x = \underline{\hspace{2cm}}$ y-intercept: $f(0) = \underline{\hspace{2cm}}$

Key Concept: Parallel & Perpendicular Lines

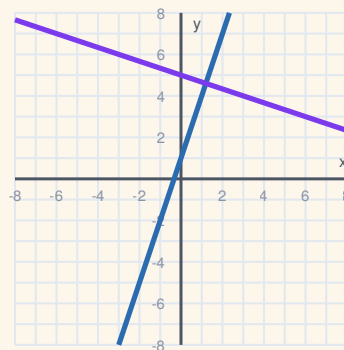
EXAMPLE 3 — Parallel

$f(x) = 2x + 3$ and $g(x) = 2x - 7$ (same slope)



EXAMPLE 4 — Perpendicular

$f(x) = 3x + 1$ and $g(x) = -\frac{1}{3}x + 5$ (slopes multiply to -1)



COMMON MISTAKE

For perpendicular slopes, you must BOTH flip the fraction AND change the sign. Also remember: $x = a$ is a VERTICAL line and is NOT a function (it fails the vertical line test)!

Guided Practice — Part A: Graph Using Slope-Intercept Form

A1 $f(x) = 2x - 3$

A2 $f(x) = -\frac{1}{2}x + 4$

Guided Practice — Part B: Find & Use the Intercepts

B1 $f(x) = 4x - 12$

B2 $f(x) = -3x + 9$

Guided Practice — Part C: Parallel, Perpendicular, or Neither?

C1 $f(x) = 5x + 2$, $g(x) = 5x - 8$

C2 $f(x) = 2x + 1$, $g(x) = -\frac{1}{2}x + 6$

C3 $f(x) = 3x + 4$, $g(x) = 4x + 4$

Guided Practice — Part D: Write a Parallel/Perpendicular Equation

D1 Parallel to $f(x) = 2x - 5$, through $(3, 4)$

D2 Perpendicular to $f(x) = -4x + 1$, through $(2, 3)$

BEFORE YOU MOVE ON

Check with a partner: for parallel/perpendicular problems, did you compare slopes **ONLY** (not y-intercepts)?