Unit 8 · Linear Functions and Graphing Cheat Sheet

Unit 8 focus: relations, functions, two-variable equations, slope and intercepts

1 KEY VOCABULARY

relation	A set of ordered pairs.	{(1, 2), (3, 5)}
function	Each input has exactly one output.	y = 2x + 1
slope	Rate of change: rise ÷ run.	$m = \frac{y_2 - y_1}{x_2 - x_1}$
y-intercept	Where the line crosses the y-axis.	b in y = mx + b

2 IS IT A FUNCTION?

No input (x) may repeat with a different output.

Example: {(2, 5), (3, 7), (2, 9)}
Check x-values: 2 has outputs 5 and 9
Answer: Not a function

3 FINDING SLOPE

Divide the change in y by the change in x.

Example: Slope through (1, 3) and (4, 12)
Rise ÷ run: $\frac{12-3}{4-1} = \frac{9}{3}$
Answer: m = 3

4 SOLUTIONS OF TWO-VARIABLE EQUATIONS

Substitute the x-value and solve for y.

Example: Is (3, 7) a solution of y = 2x + 1?
Substitute: 2(3) + 1 = 7 ✓
Answer: Yes

5 WRITING A RULE

Find the slope from the table, then the starting value.

Example: x: 0, 1, 2 → y: 4, 7, 10
Slope: y goes up 3 each time
y-intercept: 4
Answer: y = 3x + 4

6 QUICK REMINDERS & COMMON MISTAKES

✓ Do remember

- Slope = rise over run (y over x).
- Positive slope rises left to right.
- A vertical line is not a function.

✗ Common mistakes

- Slope = run ÷ rise: rise ÷ run
- Subtracting coordinates in different orders: same order top and bottom
- Confusing m and b: b is where x = 0

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More practice: writing rules, scatter plots, systems and graphing inequalities

1 SCATTER PLOTS

Pattern	Correlation
Points rise left to right	positive
Points fall left to right	negative
No pattern	no correlation

A trend line lets you make predictions.

2 SYSTEMS BY GRAPHING

Graph both lines; the solution is where they cross.

Example: $y = x + 1$ and $y = -x + 5$
Cross at: $x + 1 = -x + 5 \rightarrow x = 2$
Answer: (2, 3)

3 SYSTEMS BY SUBSTITUTION

Replace one variable with its expression from the other equation.

Example: $y = 2x$ and $x + y = 12$
Substitute: $x + 2x = 12 \rightarrow x = 4$
Answer: (4, 8)

4 GRAPHING LINEAR INEQUALITIES

$y > 2x + 1$	**dashed line, shade above**
$y \leq -x + 3$	**solid line, shade below**
Test point (0, 0)	**shade its side if true**

5 SLOPE AT A GLANCE

Line	Slope
Horizontal ($y = 4$)	0
Vertical ($x = -2$)	undefined
Parallel lines	equal slopes

6 CHECK YOURSELF

- Did I check my solution in BOTH equations?
- Is my line solid ($\leq$, $\geq$) or dashed ($<$, $>$)?
- Did I use a test point to shade?
- Does my slope sign match the graph's direction?