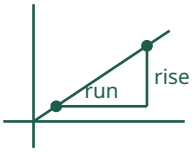
Grade 8 Math Cheat Sheet

Lines and slope

Slope-intercept	$y = mx + b$
Direct variation	$y = kx$
Slope	$m = (y_2 - y_1) / (x_2 - x_1)$

m is slope; b is the y-intercept.
k is the constant of proportionality.
Matching x-values give undefined slope.



Read a linear function

Example	$y = 2x + 3$
Starting value	$x = 0 \to y = 3$
One step in x	$x = 1 \to y = 5$

Each increase of 1 in x adds 2 to y.

Solve with x on both sides

Start	$3x + 4 = x + 12$
Simplify	$2x = 8$
Solve	$x = 4$

Check: both sides equal 16 when x = 4.

Graphing linear systems

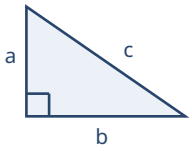
First line	$y = 2x + 1$
Second line	$y = x + 4$
Intersection	$(3, 7)$

Graph both lines in slope-intercept form. The point where they cross satisfies both equations.
Distinct parallel lines never cross.

Find a diagonal distance

Right triangle	$a^2 + b^2 = c^2$
Legs 6 and 8	$c^2 = 36 + 64 = 100$
Take the positive root	$c = 10$

On a grid, use horizontal and vertical distances as the legs.



Coordinate transformations

Translate	(x, y) becomes $(x + a, y + b)$
Reflect across x-axis	(x, y) becomes $(x, -y)$
Reflect across y-axis	(x, y) becomes $(-x, y)$
Dilate from origin	(x, y) becomes (kx, ky)

In the dilation, k is a positive scale factor.

Powers and scientific notation

Same-base product	$a^m \times a^n = a^{m+n}$
Same-base quotient	$a^m / a^n = a^{m-n}$
Negative exponent	$a^{-n} = 1/a^n$
Scientific notation	$72{,}000 = 7.2 \times 10^4$

Here a is nonzero and m and n are integers.

Use scientific notation

Large number	$42{,}000 = 4.2 \times 10^4$
Small number	$0.003 = 3 \times 10^{-3}$
Multiply and regroup	$(6 \times 10^4)(3 \times 10^2) = 1.8 \times 10^7$

For positive numbers, the coefficient is at least 1 and less than 10.