

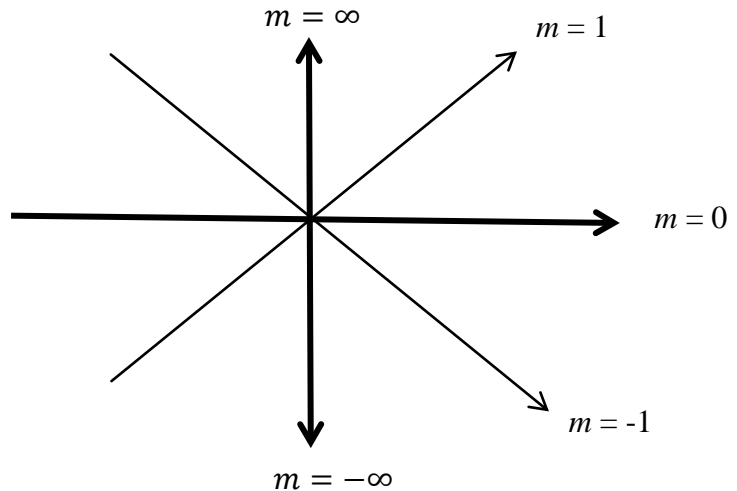
Algebra Power Hour

Slope of a line

You should understand slope three ways: qualitatively, counting steps, and the brute force formula.

The quality of slope as “steepness”

Line	Slope
Horizontal	0
Up to the right	Positive
45°	1
Steeper	Higher
Vertical	Infinite or “undefined”



Counting Steps

Pick any two “simple” points
Start with the point to the left
Steps up / down = rise
Steps right = run

$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

Brute Force Formula

Use only when necessary, especially when there are fractions or large numbers involved.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Practice: pp. 162, 251, 292

Solving Equations with the Zero Factor Property (Trick)

If two numbers multiply to zero, then one of the numbers OR the other must be zero!

A “number” is either a constant (12), a variable (x), or an expression ($x - 5$).

To solve $(x - 7)(x + 9) = 0$, set each numerical *expression* to 0. Then solve each equation for x .

Equation	One of these numbers must be zero	Therefore, x must be
$5x = 0$		
$x(x - 3) = 0$		
$8(x - 2)(x + 5) = 0$		
$(2x - 1)(7x + 4) = 0$		

“Plugging in”

Sometimes it is possible to “cheat” and avoid algebra by plugging the answer choices into an equation.

More often, you can choose your own values for variables and then just see which choice works.

1. **Choose** simple values for your variables → Make the arithmetic simple!
2. **Deduce** what must be true based on your choice(s)
3. What is the actual **question**?
4. What is the **answer** to that question?
5. **Plug** your choice(s) into options A, B, C, D, E to see which one works.
6. If two options work, **try them again** with a different choice for the variables.

(See examples on handout)

plug-in

1. choose #

2. plug

3. check

4. check all

answers.



"In terms of" is a needless phrase. If you see it, cross it out, and remember to Plug In.

PLUGGING IN

Plugging In turns algebra and geometry problems into arithmetic problems. Plug In on all problems that contain variables in the answer choices.

8. Claire is c years old and is 6 years younger than Alan. In terms of c , how many years old will Alan be in 3 years?
- (A) $c - 6$
 (B) $c - 3$
 (C) $c + 3$
 (D) $c + 5$
 (E) $c + 9$

Are there variables in the answer choices? PLUG IN!

16. If the sum of three consecutive odd integers is k , then, in terms of k , what is the greatest of the three integers?
- (A) $\frac{k-6}{3}$
 (B) $\frac{k-3}{3}$
 (C) $\frac{k}{3}$
 (D) $\frac{k+3}{3}$
 (E) $\frac{k+6}{3}$

WHAT TO PLUG IN

Choose numbers that make the arithmetic as easy as possible.

12. Lou drives 50 miles in a hours. If he must drive b miles at the same rate, in terms of a and b , how many hours will the trip take?
- (A) $\frac{a}{50b}$
- (B) $\frac{50}{ab}$
- (C) $50ab$
- (D) $\frac{50b}{a}$
- (E) $\frac{ab}{50}$

Plugging In Tips

- Try numbers that make the math easy; numbers like 2, 3, 5, and 10 work great.
- Just pick a number. If it gets messy, try another number.
- Avoid using 0 and 1 whenever possible.
- You must be willing to Plug In several times.
- Check all five answer choices if they have variables.

16. If $\frac{a}{b} = 4$ and $\frac{c}{a} = 6$, then what is the value of

$$\frac{a+b+c}{a} ?$$

- (A) 5
- (B) $5\frac{1}{2}$
- (C) $7\frac{1}{4}$
- (D) $8\frac{1}{2}$
- (E) 10



What's a good number to Plug In for b ? Why?



When we do Must Be and Could Be problems, then we sometimes use 0 and 1.