

Solving Systems of Equations

① Graphing

- best if the equations are in $y = mx + b$ form
if doing by hand or using a graphing calc.

② Substitution

- there is a special type of substitution that
some books call "comparison".

$$y = 2x + 3$$

$$y = 5x - 2$$

$$3x = 2y - 5$$

$$3x + 9y = 7$$

- use substitution
when you can
easily isolate a
variable.

③ Elimination

- use this when you easily isolate a variable

Conditional Solutions

Example Terry wants to add a text messaging plan to her cell phone package. The company she deals with has 3 different plans to choose from.

Plan	Monthly fee (y-int)	Charge per message (slope)
A	\$10 ← y-int	7¢ ← slope
B	none	15¢
C	\$15	5¢

Which plan is the best for a certain number of messages?

Step 1 - write equations to represent the plans.

let x be the # of text messages per month
 y be the total cost per month

A: $y = 0.07x + 10$

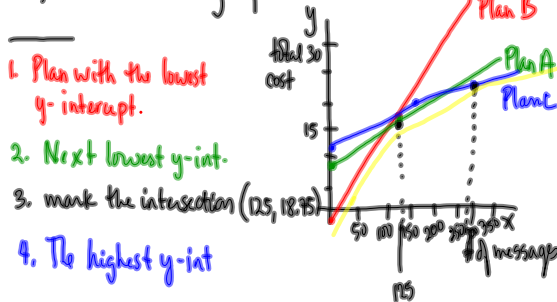
B: $y = 0.15x$

C: $y = 0.05x + 15$

Step 2 - Determine when the various plans cost the same (i.e. find the intersection points)

<p><u>A + B</u></p> $0.07x + 10 = 0.15x$ $\frac{10}{0.08} = \frac{0.08x}{0.08}$ $x = 125$	<p><u>B + C</u></p> $0.15x = 0.05x + 15$ $\frac{0.10x}{0.10} = \frac{15}{0.10}$ $x = 150$	<p><u>A + C</u></p> $0.07x + 10 = 0.05x + 15$ $0.02x + 10 = 15$ $\frac{0.02x}{0.02} = \frac{5}{0.02}$ $x = 250$
<p>Plans A and B will cost the same for 125 messages</p> <p>Sub $x = 125$ into</p> $y = 0.15x$ $y = 0.15(125)$ $y = 18.75$ <p>$(125, 18.75)$</p>	<p>Plans B and C will cost the same for 150 messages</p> <p>Sub $x = 150$ into</p> $y = 0.15x$ $y = 0.15(150)$ $y = 22.50$ <p>$(150, 22.50)$</p>	<p>Plans A and C will cost the same for 250 messages</p> <p>Sub $x = 250$ into</p> $y = 0.07x + 10$ $y = 0.07(250) + 10$ $y = 17.50 + 10$ $y = 27.50$ <p>$(250, 27.50)$</p>

Step 3 - Sketch a graph



Step 4 - Write a conclusion based on the graph.

Plan B is best for less than 125 messages per month
 Plan A is best for between 125 and 250 messages