

# Solving Linear Systems | MPM2D

Motivation: Where do the following two lines meet?

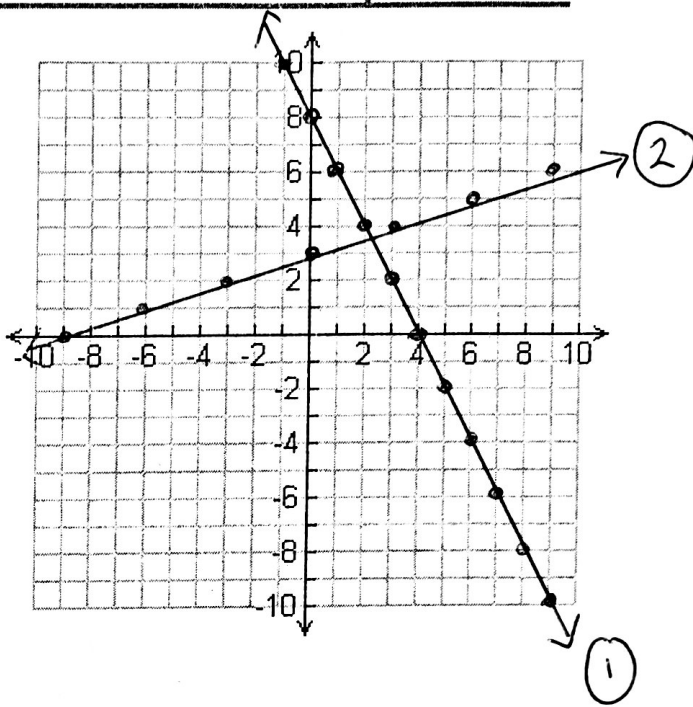
$$y = -2x + 8 \quad \textcircled{1}$$

slope =  $-2/1$       y-intercept =  $(0, 8)$

$$y = \frac{1}{3}x + 3 \quad \textcircled{2}$$

slope =  $\frac{1}{3}$       y-intercept =  $(0, 3)$

Where do they meet?      Around  $(2.5, 3.5)$



What you have just done is solve a linear system of two lines.

A linear system – a pair of lines considered at the same time

Point of intersection – Where the two lines meet, the point that is common between the two lines.

Today's focus will be on solving linear systems by graphing. We will see that this is not always a viable strategy, and start developing algebraic methods next week.

Example: Solve the following linear system by graphing...

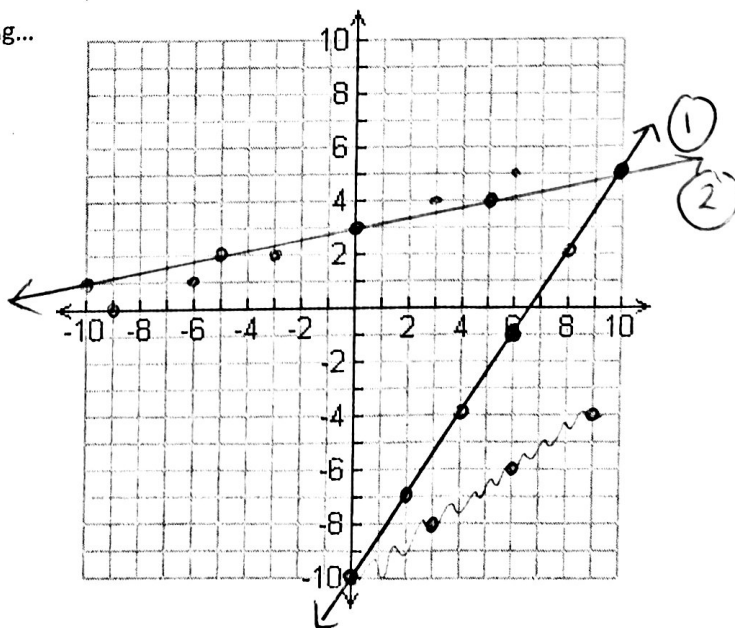
$$y = \frac{3}{2}x - 10 \quad \textcircled{1}$$

slope =  $\frac{3}{2}$       y-intercept =  $(0, -10)$

$$y = \frac{1}{5}x + 3 \quad \textcircled{2}$$

slope =  $\frac{1}{5}$       y-intercept =  $(0, 3)$

Point of Intersection:  $(10, 5)$   
 $x \quad y$



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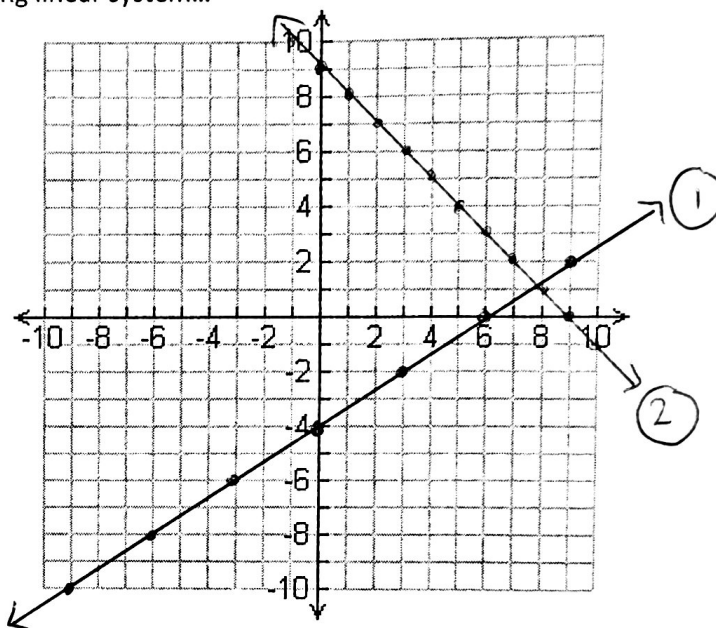
Example: Estimate the point of intersection of the following linear system...

$$y = \frac{2}{3}x - 4 \quad \textcircled{1}$$

slope =  $\frac{2}{3}$       y-intercept =  $(0, -4)$

$$y = -x + 9 \quad \textcircled{2}$$

slope =  $-1$       y-intercept =  $(0, 9)$



Estimated Point of Intersection:

Approximately  $(8, 1)$

KEY IDEA: Not every linear system can be solved by graphing. We will develop algebraic methods to solve linear systems.

Example: Pool A charges swimmers a flat fee of 10\$ every month, and \$2.50 for each additional swim.  
Pool B charges swimmers \$3.50 per swim, with no flat fee.

a) Graph a line represent each pools fees.

b) How many swims result in the same monthly cost at each pool?

10 swims costs \$35 for both

