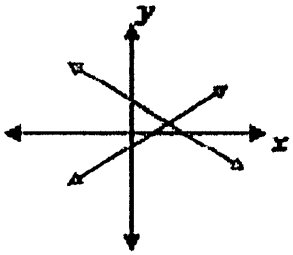
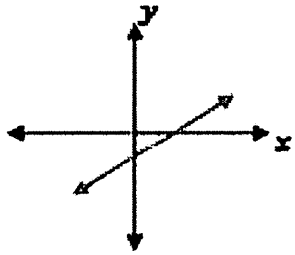
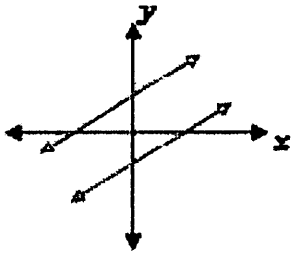
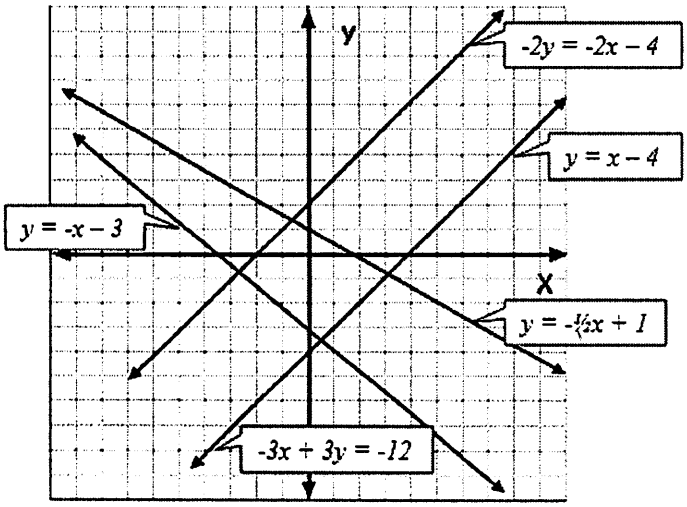
Solving Systems Graphically: Special Cases

Graph of a System			
Number of Solutions	One	Infinitely Many	Zero

What can we tell from the slopes and *y-intercepts?*

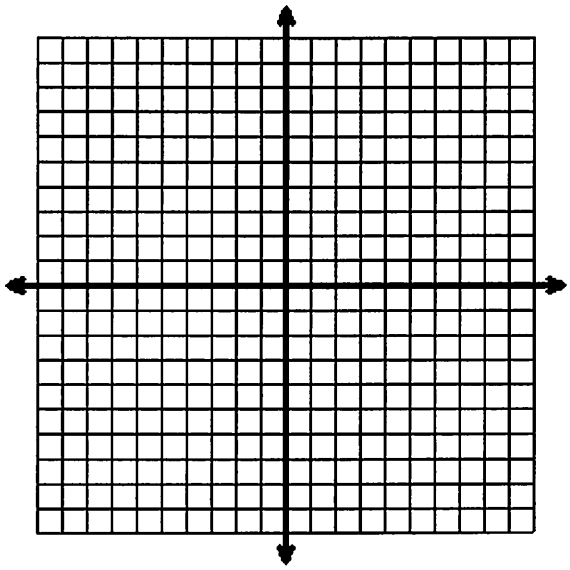


Determine 2 Equations that produce ONE Solution	Determine 2 Equations that produce NO Solutions	Determine 2 Equations that produce INFINITELY MANY Solutions

Determine the Solutions to the System of Equations

A: $y = -2x + 1$

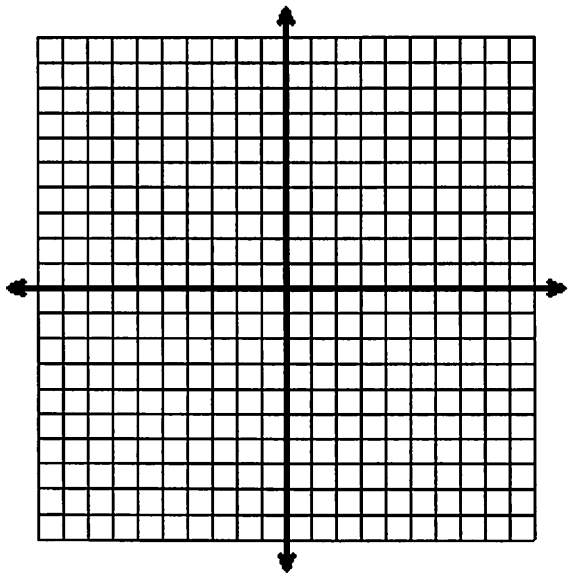
B: $2y = -4x - 8$



Solution:

A: $2x + 4y = 8$

B: $y = -\frac{1}{2}x + 2$

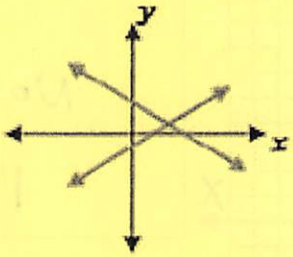
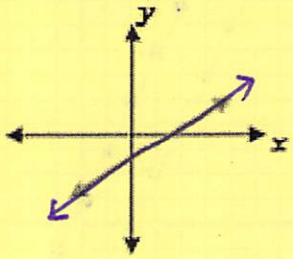
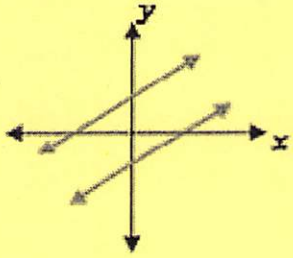


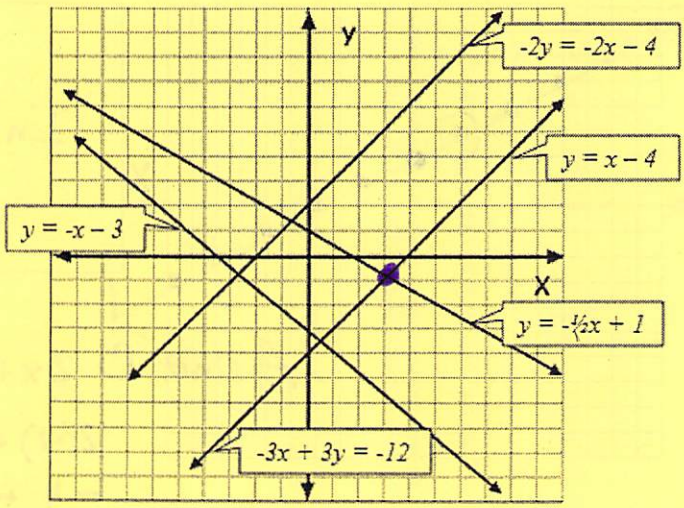
Solution:

Without Graphing, decide whether each system has *one solution, no solutions,* or *infinitely many solutions*

$y = 2x$ $y = 2x - 5$	$x + y = 10$ $2x + 2y = 8$	$y = -3x + 1$ $y = 3x + 7$	$2x - 5y = 20$ $y = \frac{3}{5}x + 4$

Solving Systems Graphically: Special Cases

Graph of a System			
Number of Solutions	One	Infinitely Many	Zero
What can we tell from the slopes and *y-intercepts*?	Different Slopes	Same Slope Same Y-intercept	Same Slope Different Y-intercepts



Determine 2 Equations that produce ONE Solution

$y = x - 4$

$y = -\frac{1}{2}x + 1$

Determine 2 Equations that produce NO Solutions

$y = x - 4$

$\frac{-2y}{-2} = \frac{-2x}{-2} - \frac{4}{-2}$

$y = x + 2$

Determine 2 Equations that produce INFINITELY MANY Solutions

$-3x + 3y = -12$
$+3x \quad +3x$

$\frac{3y}{3} = \frac{3x}{3} - \frac{12}{3}$

$y = x - 4$

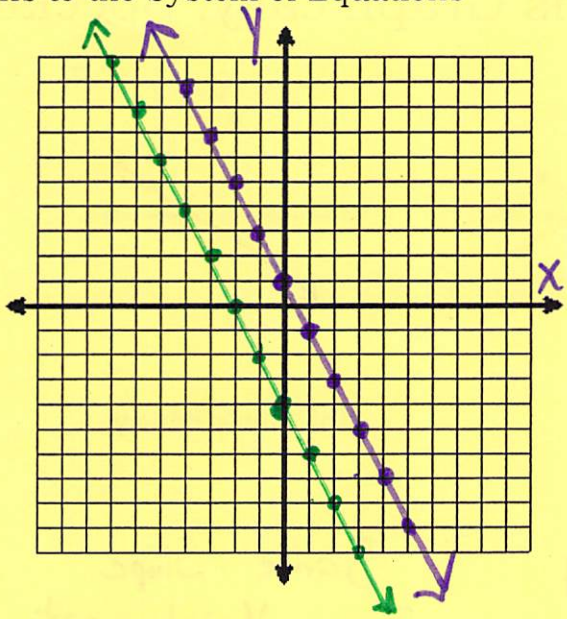
$y = x - 4$

Determine the Solutions to the System of Equations

A: $y = -2x + 1$

B: $\frac{2y}{2} = \frac{-4x}{2} - \frac{8}{2}$

$y = -2x - 4$



Solution:

No Solutions

|| Lines

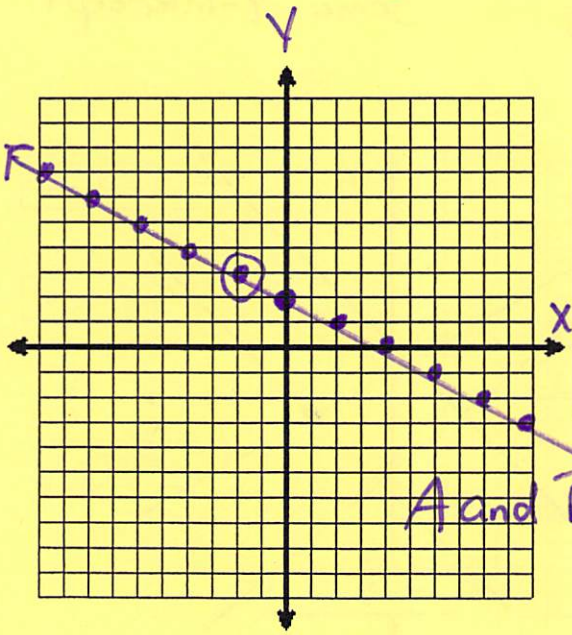
A: $2x + 4y = 8$

$-2x \quad -2x$

$\frac{4y}{4} = \frac{-2x}{4} + \frac{8}{4}$

$y = -\frac{1}{2}x + 2$

B: $y = -\frac{1}{2}x + 2$



Solution:

Infinitely Many Solutions

$(-2, 3)$

$2x + 4y = 8$

$2(-2) + 4(3) = 8$

$-4 + 12 = 8$

$8 = 8$ ✓

$y = -\frac{1}{2}x + 2$

$3 = -\frac{1}{2}(-2) + 2$

$3 = 1 + 2$

$3 = 3$ ✓

Without Graphing, decide whether each system has *one solution, no solutions,* or *infinitely many solutions*

$y = 2x$
$y = 2x - 5$

Parallel

No Solutions

$x + y = 10$
$2x + 2y = 8$

$-x \quad -x$

$y = -x + 10$

Parallel

No Solutions

$2x + 2y = 8$

$-2x \quad -2x$

$\frac{2y}{2} = \frac{-2x}{2} + \frac{8}{2}$

$y = -x + 4$

$y = -3x + 1$
$y = 3x + 7$

One Solution

$2x - 5y = 20$

$y = \frac{3}{5}x + 4$

ONE Solution

$2x - 5y = 20$

$-2x \quad -2x$

$\frac{-5y}{-5} = \frac{-2x}{-5} + \frac{20}{-5}$

$y = \frac{2}{5}x - 4$