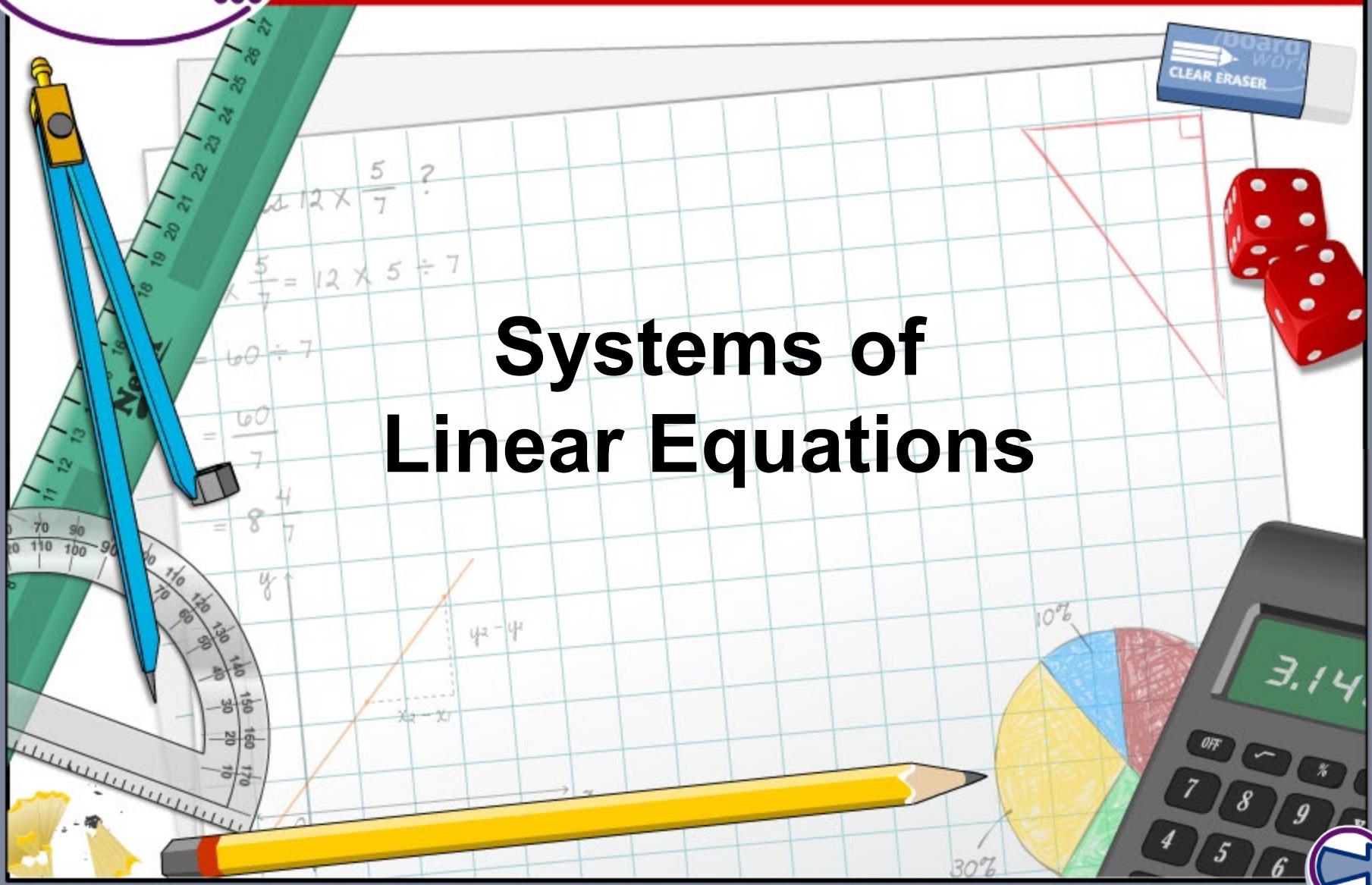


Systems of Linear Equations

Information

Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.

Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

These are:

1) Make sense of problems and persevere in solving them.

2) Reason abstractly and quantitatively.

3) Construct viable arguments and critique the reasoning of others.

4) Model with mathematics.

5) Use appropriate tools strategically.

6) Attend to precision.

7) Look for and make use of structure.

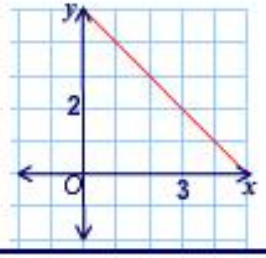
8) Look for and express regularity in repeated reasoning.

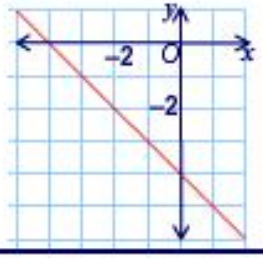
This icon indicates that the slide contains activities created in Flash. These activities are not editable.

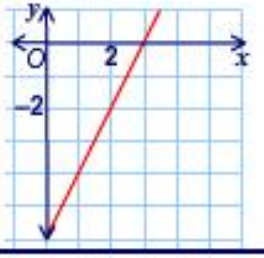
This icon indicates teacher's notes in the Notes field.

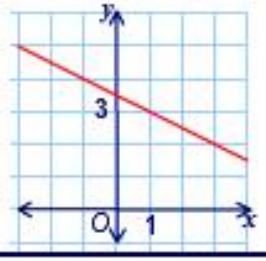
Linear graphs review

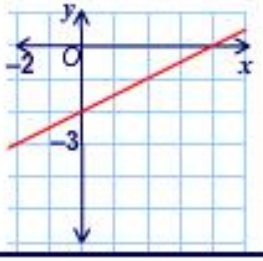
Match these equations to the correct graph

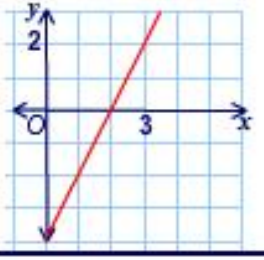












$2x - y = 6$

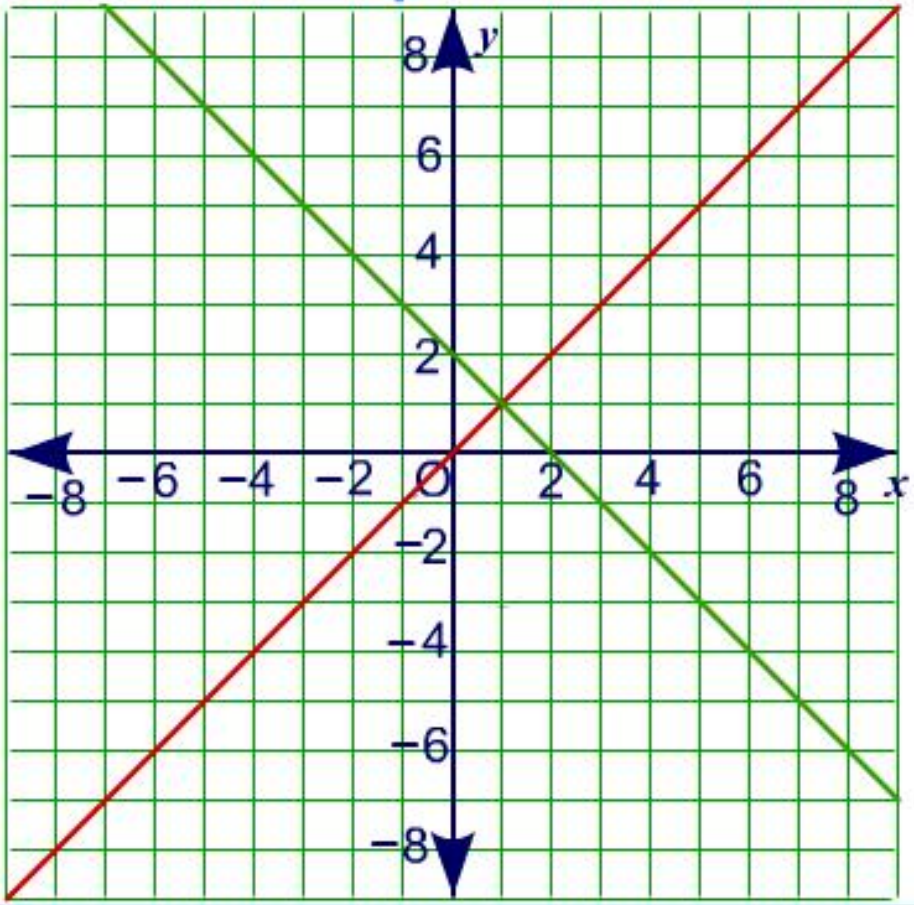
Systems of equations

MODELING

Carlos is choosing a phone plan. Plan A costs $10 per month plus $0.10 per minute used, and Plan B costs $30 plus $0.05 per minute. How many minutes would Carlos have to use for Plan B to be cheaper?

Solving by graphing

What is the point of intersection of the two equations?



$1x - 1y = 0$

$1x + 1y = 2$

Intersection:

Solving algebraically

Not all systems of equations are easy to solve by looking at a graph. Could we have found the point where these lines intersect from the equations alone?

Plan A: $y = 0.1x + 10$

Plan B: $y = 0.05x + 30$

Tickets to the fair cost $8 for adults and $5 for children. If 3000 people attended and $17,550 was collected, how many adults and how many children went to the fair?

Press the "=" button to show the work step by step.

Parallel lines

Sometimes systems of equations produce graphs that are **parallel**.

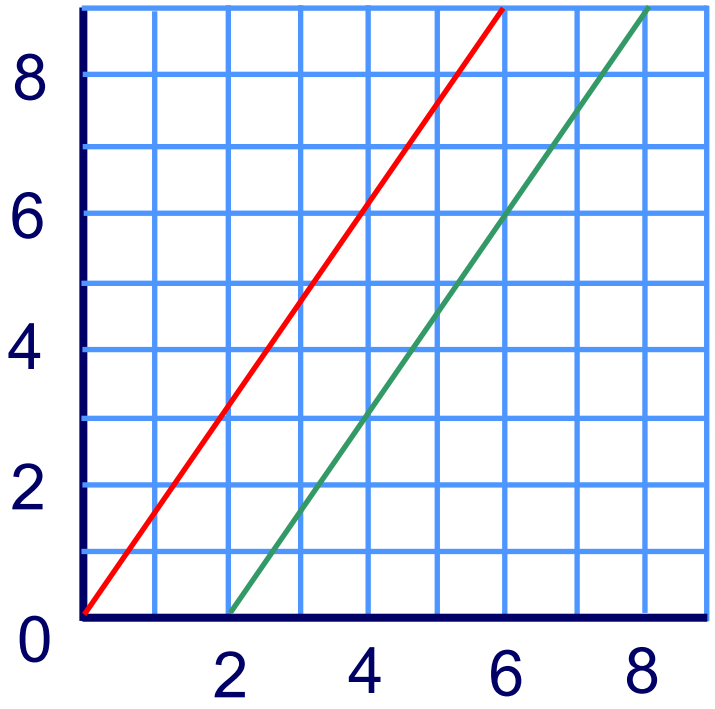
Will these lines ever cross the same point?

$$y = \frac{3}{2}x$$

$$y = \frac{3}{2}x - 3$$

No. When a system of equations produces parallel lines, there are **no solutions**.

How can we tell if two lines will be parallel without graphing them?



Special solutions

If two lines are parallel, they will have the same **slope**.

Will this system of equations have any solutions? Why or why not?

$$y - 2x = 3 \text{ and } 2y = 4x + 1$$

If we write them in the form $y = mx + b$, the slope is given by the value of m.

$y - 2x = 3$ $\qquad$ $2y = 4x + 1$

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

Slope = 2 $\qquad$ **Slope = 2**

The lines are parallel, so they will have no solutions.

Special solutions

How many solutions does this system of equations have?

$2x + y = 3$ and $6x + 3y = 9$.

How can we write these equations in the form $y = mx + b$?

$2x + y = 3$

$y = -2x + 3$

$6x + 3y = 9$

$3y = -6x + 9$

$y = -2x + 3$

These are two equations for the same line.
How many solutions will the system have?

The lines share all of their points, so there are an **infinite number** of solutions.

How many solutions?

How many solutions do these systems of equations have?

$$-9x - y = -42$$

$$-x + 8y = -29$$

one

infinitely many

none