# Solving Real World Systems by Graphing

Today, the temperature in New York is -1 degree and is expected to rise 3 degrees per day.

It's 6 degrees in Alaska and expected to fall 1 degree every 2 days.

In New York, m = _____ b= _____Equation_____

In Alaska, m = _____ b= ____ Equation _____

Now, graph both equations.

**Systems of equations Real World graphing**

Today, the temperature in New York is -1 degree and is expected to rise 3 degrees per day.

It's 6 degrees in Alaska and expected to fall 1 degree every 2 days.

In New York, m = 3 b= -1 Equation y = 3x - 1

In Alaska, m = $-\frac{1}{2}$ b= 6 Equation $y = -\frac{1}{2}x + 6$

Now, graph both equations.

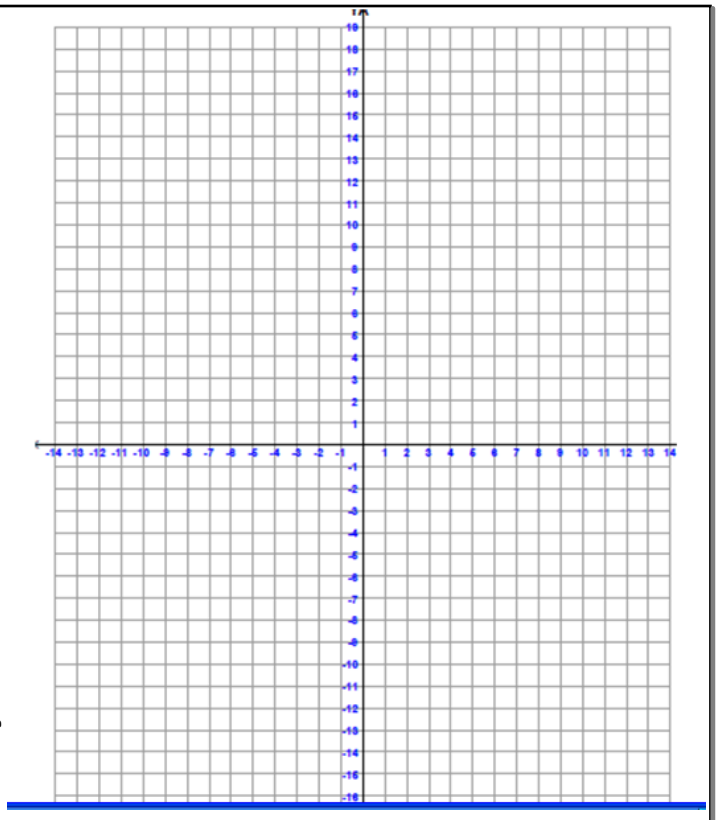
# Story/Answer

## Weakanswer

After _____ days the temperature in both cities will be _____.

## StrongAnswer

After ___ days the temperature in both cities was _____ . Before _____ days, it was colder in _____ . After _____ days it was colder in _____.



**Systems of equations Real World graphing**

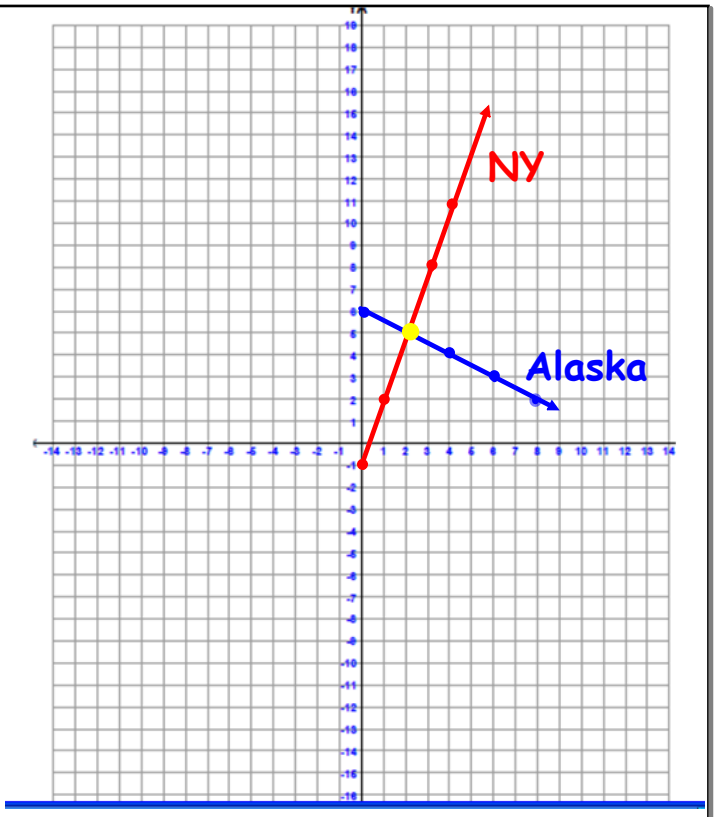
# Story/Answer

## Weakanswer

After 2 days the temperature in both cities will be 5°.

## StrongAnswer

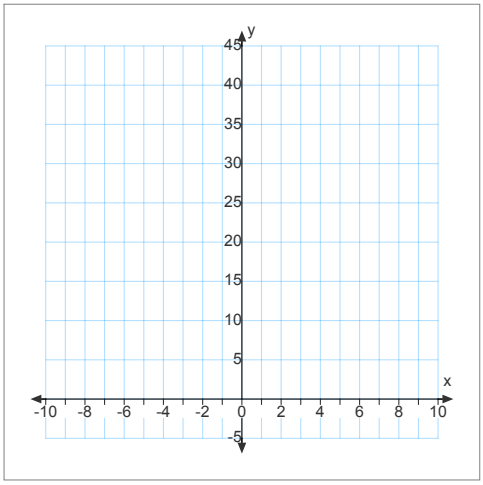
After 2 days the temperature in both cities was 5° . Before 2 days, it was colder in NY . After 2 days it was colder in Alaska.




Suppose you have $20 in your bank account. You start saving $5 each week. Your friend has $5 in his account and is saving $10 each week. Assume neither of you make any withdrawals.

| You | A Friend |
|---|---|
| m= | m= |
| b= | b= |
| Equation: | Equation: |

Now graph each line. Label the x axis with _____ and the y axis with _____.




1)After how many weeks will you and your friend have the same amount of money in your accounts? ____ How much money will each of you have? ___

2) Make an x-y table for each equation. ⟶

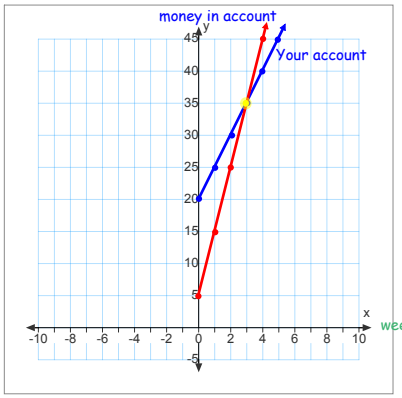
3) Check each equation using substitution.

# Systems of equations Real World graphing

Suppose you have $20 in your bank account. You start saving $5 each week. Your friend has $5 in his account and is saving $10 each week. Assume neither of you make any withdrawals.

| You | A Friend |
|---|---|
| m= 5 | m= 10 |
| b= 20 | b= 5 |
| Equation: y = 5x + 20 | Equation: y = 10x + 5 |

Now graph each line. Label the x axis with weeks and the y axis with money in account.




1)After how many weeks will you and your friend have the same amount of money in your accounts? 3 How much money will each of you have? $35

2) Make an x-y table for each equation.

3) Check each equation using substitution.

Check: (3,35)

| y=5x+20 | y=10x+5 |
|---|---|
| 35=5(3)+20 | 35=10(3)+5 |
| 35=15+20 | 35=30+5 |
| 35=35 ✓ | 35=35 ✓ |

You
y = 5x + 20

| x | y |
|---|---|
| 0 | 20 |
| 1 | 25 |
| 2 | 30 |
| 3 | 35 |
| 4 | 40 |
| 5 | 45 |

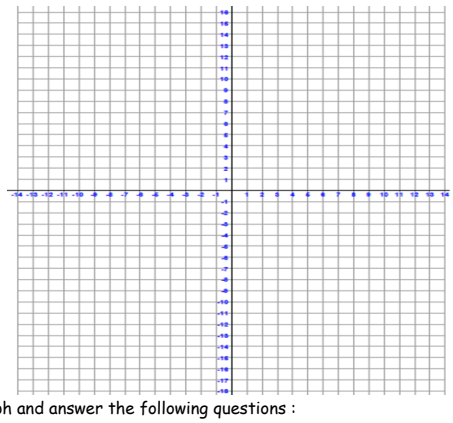
Friend
y = 10x + 5

| x | y |
|---|---|
| 0 | 5 |
| 1 | 15 |
| 2 | 25 |
| 3 | 35 |
| 4 | 45 |
| 5 | 55 |

The temperature in Syracuse, NY started at -14°C and rose 2 degrees Every hour. The temperature in Mamaroneck, NY started at -2°C and rose 1 degree every 2 hours.

| Syracuse: | Mamaroneck: |
|---|---|
| m= | m= |
| b= | b= |
| Equation: | Equation: |

Now graph each line. Label the x axis with _____ and the y axis with _____.



Look at your graph and answer the following questions :

1) After how many hours will the temperatures be the same? _____

2) What is this temperature? _____

3) Write the solution to this problem as an ordered pair. _____

4) Make an x-y table for each equation.

5) Check each equation using substitution.

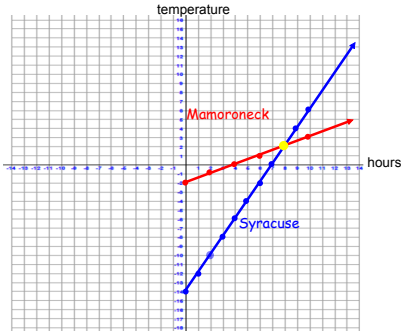
# Systems of equations Real World graphing

The temperature in Syracuse, NY started at -14°C and rose 2 degrees Every hour. The temperature in Mamaroneck, NY started at -2°C and rose 1 degree every 2 hours.

Syracuse:
m= 2
b= -14
Equation: y = 2x - 14

Mamaroneck:
m= 1
b= -2
Equation: $y = \frac{1}{2}x - 2$

Now graph each line. Label the x axis with hours and the y axis with temperature.




Look at your graph and answer the following questions :

1) After how many hours will the temperatures be the same? 8

2) What is this temperature? 2°

3) Write the solution to this problem as an ordered pair. (8,2)

4) Make an x-y table for each equation.

5) Check each equation using substitution.

Check: (12,10)

| $y = 2x - 14$ | $y = \frac{1}{2}x - 2$ |
|---|---|
| 2 = 2(8) - 14 | 2 = 1/2(8) - 2 |
| 2 = 16 - 14 | 2 = 2-2 |
| 2=2 ✓ | 2=2 ✓ |

Syracuse
y = 2x - 14

| x | y |
|---|---|
| 0 | -14 |
| 1 | -12 |
| 2 | -10 |
| 3 | -8 |
| 4 | -6 |
| 5 | -4 |
| 6 | -2 |
| 7 | 0 |
| 8 | 2 |

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

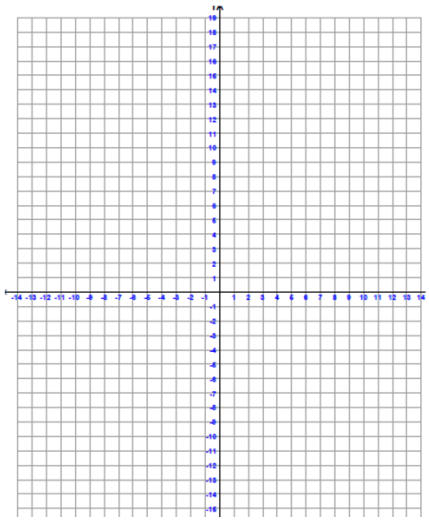
| x | y |
|---|---|
| 0 | -2 |
| 2 | -1 |
| 4 | 0 |
| 6 | 1 |
| 8 | 2 |
| 10 | 3 |

Suppose you are testing 2 fertilizers on bamboo plants A and B which are growing under identical conditions. Plant A is 6 inches tall and growing at a rate of 4 inches each day. Plant B is 10 inches tall and i growing at a rate of 2 inches each day.

Plant A
m=
b=
Equation:

Plant B
m=
b=
Equation:

Now graph each line. Label the x axis with _____ and the y axis with _____.



1)Find the "Solution" or Point of Intersection. What does the solution mean in terms of the experiment

2) Make an x-y table for each equation.

3) Check each equation using substitution.

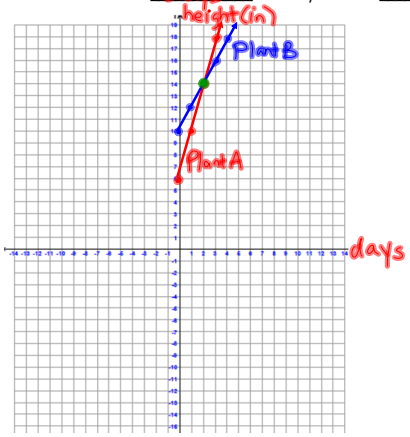
# Systems of equations Real World graphing

Suppose you are testing 2 fertilizers on bamboo plants A and B which are growing under identical conditions. Plant A is 6 inches tall and growing at a rate of 4 inches each day. Plant B is 10 inches tall and i growing at a rate of 2 inches each day.

Plant A
m= 4
b= 6
Equation: $y=4x+6$

Plant B
m= 2
b= 10
Equation: $y=2x+10$

Now graph each line. Label the x axis with days and the y axis with height (in).




1)Find the "Solution" or Point of Intersection. What does the solution mean in terms of the experiment
(2,14) → in 2 days, both plants will be 14 inches tall.

2) Make an x-y table for each equation.

3) Check each equation using substitution.

Check: (2,14)

$y=4x+6$
$14=4(2)+6$
$14=8+6$
$14=14$ ✓

$y=2x+10$
$14=2(2)+10$
$14=4+10$
$14=14$ ✓

Plant A

| x | y |
|---|---|
| 0 | 6 |
| 1 | 10 |
| 2 | 14 |
| 3 | 20 |

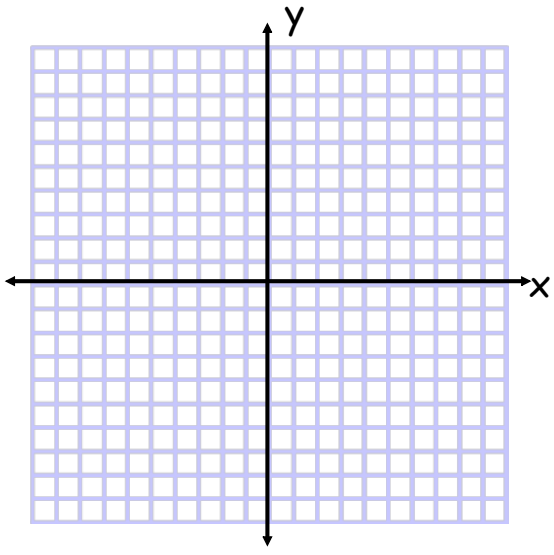
Plant B

| x | y |
|---|---|
| 0 | 10 |
| 1 | 12 |
| 2 | 14 |
| 3 | 16 |

You are navigating a battleship during war games. Your mission is to lay mines at the points where the enemy travel lanes intersect. The enemy travel lanes are represented by the following equations. At what 3 points do you lay your mines?

**Graph the lines**

Enemy Lane 1: $x - y = -4$
Enemy Lane 2: $5x - y = 8$
Enemy Lane 3: $x - 2y = -2$



## Systems of equations Real World graphing

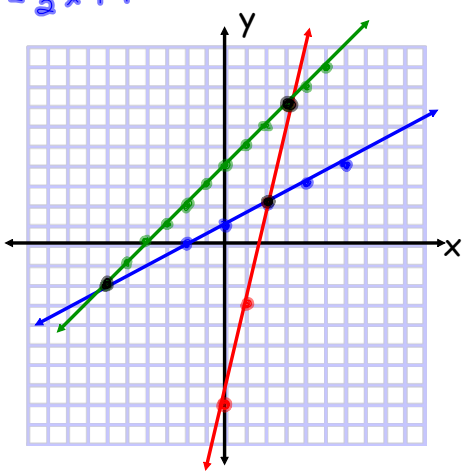
You are navigating a battleship during war games. Your mission is to lay mines at the points where the enemy travel lanes intersect. The enemy travel lanes are represented by the following equations. At what 3 points do you lay your mines?

**Graph the lines**

Enemy Lane 1: $x - y = -4$ → $y = x + 4$

Enemy Lane 2: $5x - y = 8$ → $y = 5x - 8$

Enemy Lane 3: $x - 2y = -2$ → $y = \frac{1}{2}x + 1$




Solutions:

(-6, -2)

(2, 2)

(3, 7)

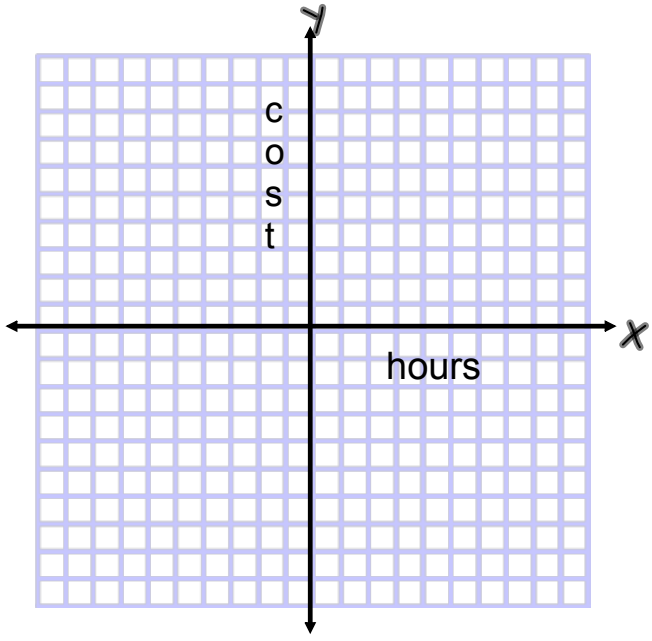
You and your friends want to go to a skate park on Saturday. There are two parks in your neighborhood, Sam's Skate Park, and Brad's Skate Park. The parks both charge for skating at their park. Each parks price is described below.

Sam's Skate Park: $3 to get into the park and $1 for **every hour.**

Brad's Skate Park: $5 to get into the park and $0.50 for every hour.

**Sam's Skate Park** **equation:** _____

**Brad's Skate Park** **equation:** _____




**Answer the following questions.**

1. Where do the two lines intersect?

2. What does this intersection mean?

3. Which park do you think you and your friend will go skating at? Explain why you chose this park.

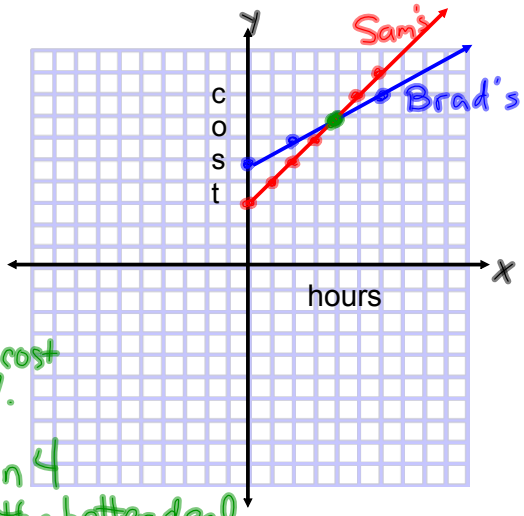
## Systems of equations Real World graphing

You and your friends want to go to a skate park on Saturday. There are two parks in your neighborhood, Sam's Skate Park, and Brad's Skate Park. The parks both charge for skating at their park. Each parks price is described below.

Sam's Skate Park: $3 to get into the park and $1 for every hour.
Brad's Skate Park: $5 to get into the park and $0.50 for every hour.

Sam's Skate Park equation: $y = 1x + 3$

Brad's Skate Park equation: $y = \frac{1}{2}x + 5$



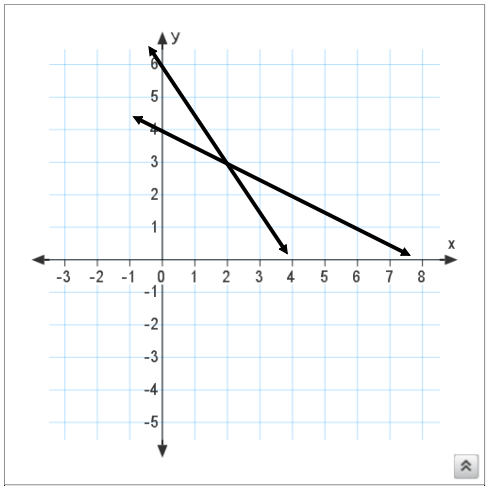

Answer the following questions.

1. Where do the two lines intersect? (4,7)
2. What does this intersection mean?
   At 4 hours, both parks will cost $7.
3. Which park do you think you and your friend will go skating at? Explain why you chose this park. It depends.

If we skate less than 4 hours, Sam's Park is the better deal.

If we skate more than 4 hours, Brad's Park is the better deal.

Tell me a story.....




Susie had 4 cupcakes. She ate 1 cupcake every 2 hours while she worked.

Johnny had 6 cupcakes. He ate 3 cupcakes every 2 hours while he worked.

Write two equations and name the P.O.I.

$y = -\frac{1}{2}x + 4$ and $y = -\frac{3}{2}x + 6$ P.O.I (2,3)

After 2 hours, Susie and Johnny both ate 3 cupcakes.