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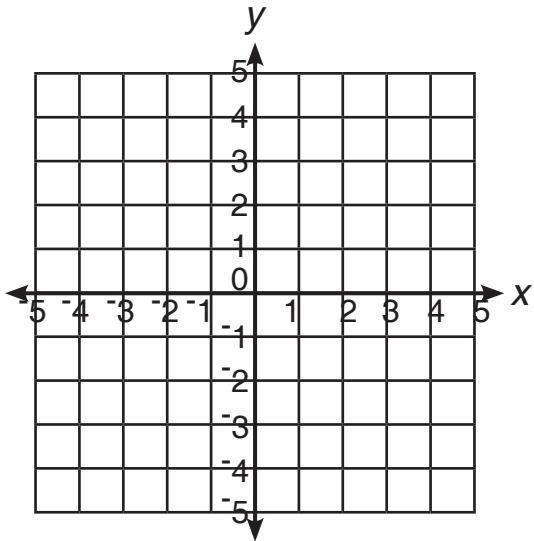
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COORDINATE PLANE

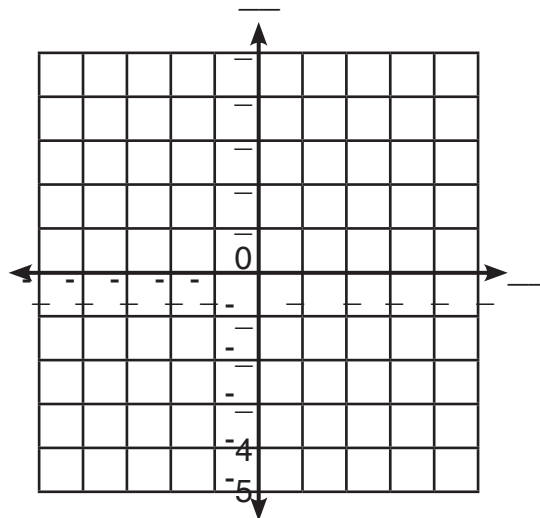
Stand up. Stretch out your arms. You have made a human coordinate plane!

A coordinate plane is a graph. It has two number lines that cross. The x axis is horizontal like your arms. The y axis is vertical. It goes up and down like your body.



The axes cross at $(0, 0)$, the point of origin. The arrows on the lines mean the lines go on forever.

The Game: Look at the coordinate graph below. Label the x axis and the y axis. Include the positive and negative numbers.

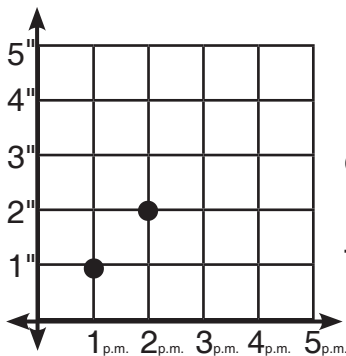


TELLING THE FUTURE

Look at trends to predict the future.

Break It Down:

You can predict the future! Not really, but you can have an idea about what might happen.



Example:

It began to rain at noon.

By 1 p.m., it had rained one inch.

By 2 p.m., it had rained two inches.



If it keeps raining at the same rate, how many inches of rainfall will there be by 3 p.m.? ____ inches

The Game: Plot the rainfall, graph the line, and fill in the blanks.

It began to rain at noon.

By 1 p.m., it had rained one inch.

By 2 p.m., it had rained two inches.

By 4 p.m., it had rained a total of four inches.

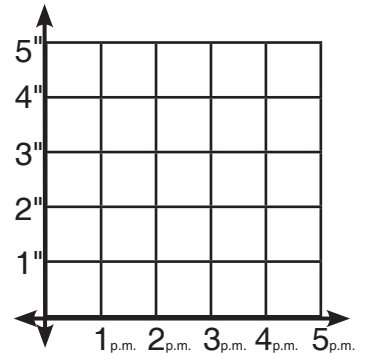
Plot the rainfall. Draw a line through the points.

It keeps raining!

What do you think the total rainfall will be at 5 p.m.? ____ inches

What do you think the total rainfall will be at 6 p.m.? ____ inches

Do you predict that there is a chance of a flood? _____



What is another word for guess or foretell? _____

QUADRATIC

Quadratic equations explain about real life, such as a thrown ball's path through the air.



Break It Down:

A quadratic equation is an equation with one or more variables in it raised to the second power, or squared, and there are no variables in it that have a higher power than that. Look for x^2 or y^2 in it!

Attention! This is the form for a quadratic equation that we are going to use:

$$y = ax^2 + bx + c$$

(a , b , and c can have any value, except that a cannot be 0.)

Examples of quadratic equations:

$$0 = 2x^2 + 5x + 3$$

$$x^2 + 3x + 5 = 0$$

$$3x^2 - 4x + 3 = 0$$

$$-5x^2 - 2x + 3 = 7$$

This is a quadratic equation too:

$$0 = x^2 - 2x$$

Don't be tricked! $a = 1$, $b = -2$, and $c = 0$

The Game: Write the term including the variable that is raised to the second power in each quadratic equation.

Ex: $3x^2 - 4x + 3 = 0$ $3x^2$

$y = ax^2 + bx + c$ _____

$-5x^2 - 2x + 3 = 7$ _____

$0 = 2x^2 + 5x + 3$ _____

$0 = x^2 - 2x$ _____

$y = 1x^2 + 3x + 2$ _____

$3x^2 - 4x + 3 = 0$ _____

$0 = 1x^2 + -2x$ _____

$x^2 + 3x + 5 = 0$ _____



What is the form that we are using for a quadratic equation?

IN STANDARD FORM

Rewrite quadratic equations in standard form.

Break It Down:

$$y = ax^2 + bx + c$$

Change to standard form. →

Find a . →

Find b . →

Find c . →

$$y = x^2 + 2$$

$$y = x^2 + 0x + 2$$

$$a = 1$$

$$b = 0$$

$$c = 2$$

Change to standard form. →

Find a . →

Find b . →

Find c . →

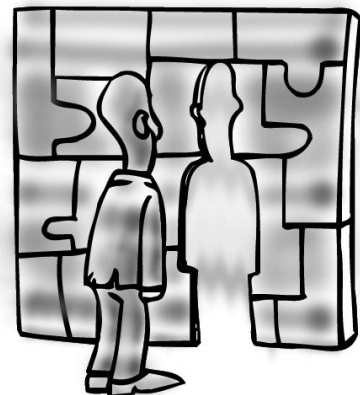
$$-3x^2 + x + 1$$

$$y = -3x^2 + x + 1$$

$$a = -3$$

$$b = 1$$

$$c = 1$$



The Game: Fill in the blanks.

Change to standard form. →

Find a . →

Find b . →

Find c . →

$$x^2 - 1$$

$$y = 1x^2 + 0x + \underline{\hspace{2cm}}$$

$$a = 1$$

$$b = 0$$

$$c = \underline{\hspace{2cm}}$$

Change to standard form. →

Find a . →

Find b . →

Find c . →

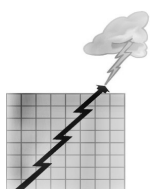
$$y = x^2 - 2x$$

$$y = \underline{\hspace{2cm}}x^2 - 2x + \underline{\hspace{2cm}}$$

$$a = 1$$

$$b = -2$$

$$c = \underline{\hspace{2cm}}$$



Does a quadratic equation have a constant term? _____

SHAPE

The shape of the parabola is important.

Break It Down:

The shape tells about the coefficient.

The coefficient is a number that is multiplied by a letter (variable).

Examples:

2 is the coefficient of x^2 . →

$2x^2$

-2 is the coefficient of x^2 . →

$-2x^2$

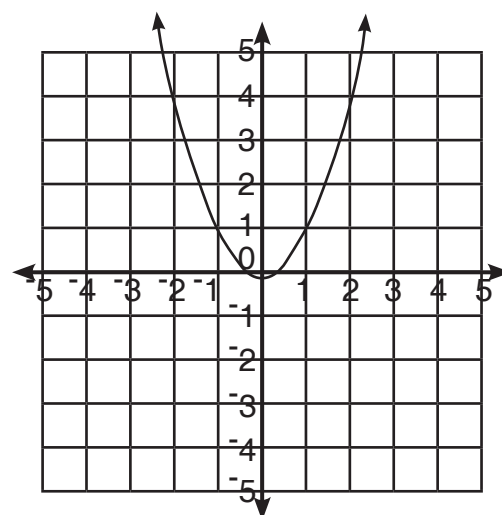
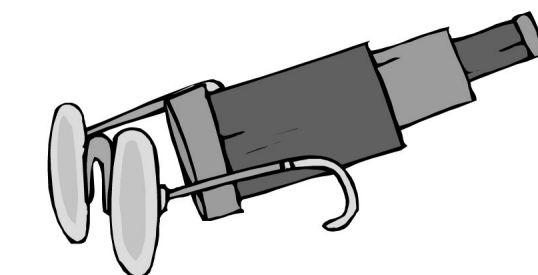
x^2 or $1x^2$

This parabola opens upward.

The coefficient is positive.

The coefficient is 1.

Does the U-shaped parabola look like a cup or a cap? _____



The left half of this parabola is the mirror image of the right half. The parabola is vertical and is symmetrical about the y-axis, so it is an even function.

**The Game: Write the coefficients of x^2 .
Write P for POSITIVE or N for NEGATIVE.**

Coefficient P or N

$2x^2$ _____

$1x^2$ _____

$-5x^2$ _____

$4x^2$ _____

$6x^2 + 3$ _____