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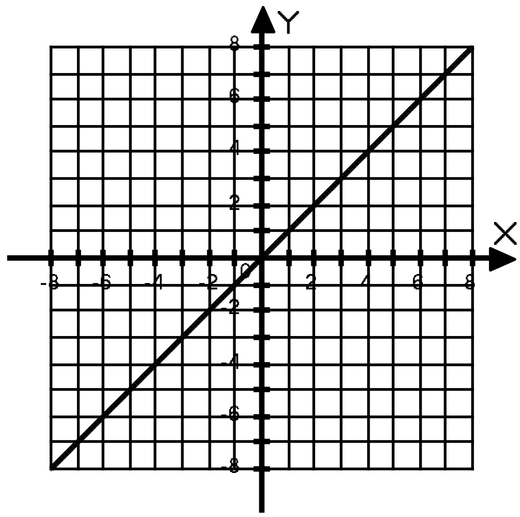
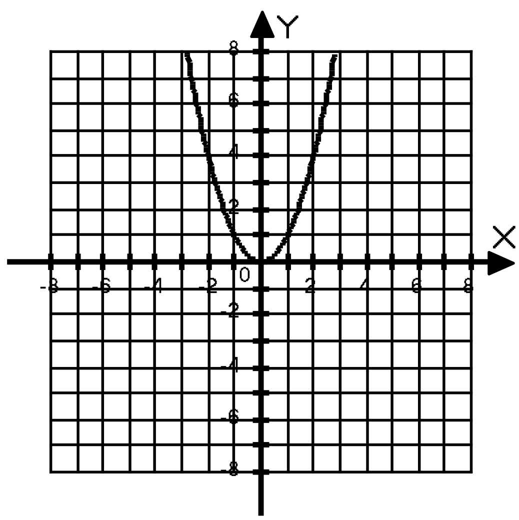
GRAPHS AT A GLANCE



"Stripped-Down" Version
Parent Equations

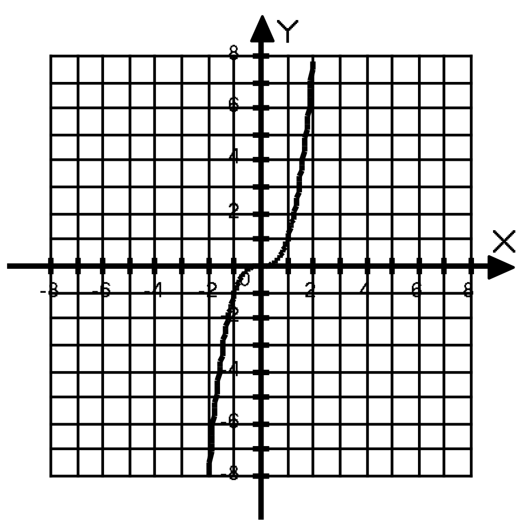
Linear Equation

$$y = x$$



Quadratic Equation

$$y = x^2$$



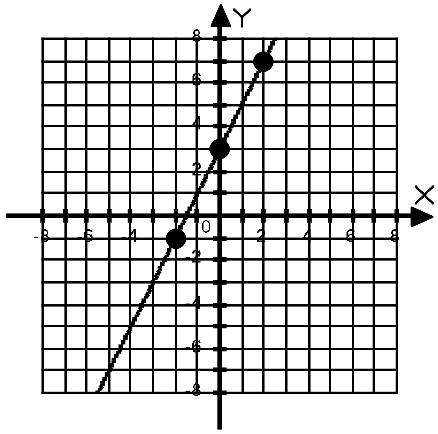
Cubic Equation

$$y = x^3$$

LINEAR EQUATIONS

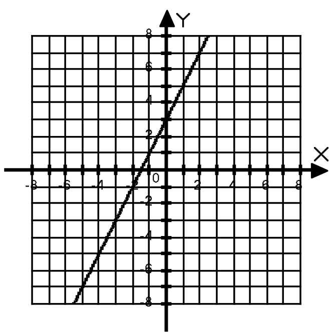
$y = 2x + 3$

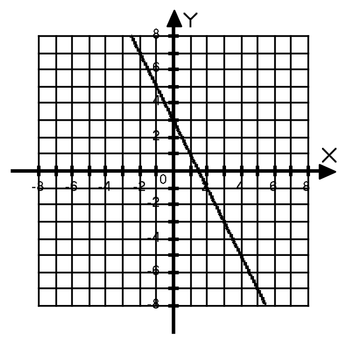
X	Y
2	7
0	3
-2	-1



1. The constant is the y-intercept.

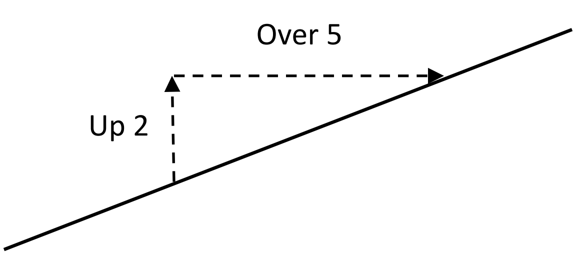
2. Positive x, line goes up to the right. Negative x, line goes up to the left.



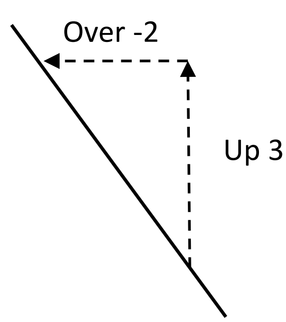


3. The number in front of the x (coefficient), is the slope. UP & OVER!

   Slope is written as a fraction: $\dfrac{up}{over}$



This line has a slope of $\frac{2}{5}$.



This line has a slope of $-\frac{3}{2}$

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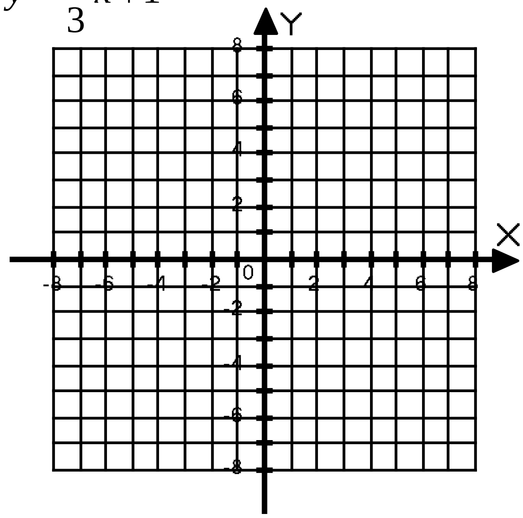
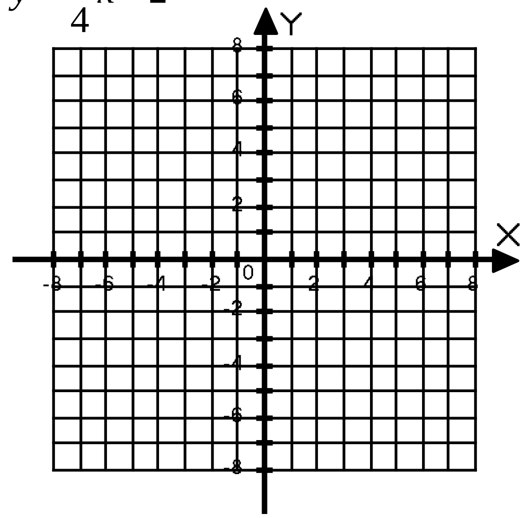
LINEAR EQUATIONS

Sketch the following linear equations:

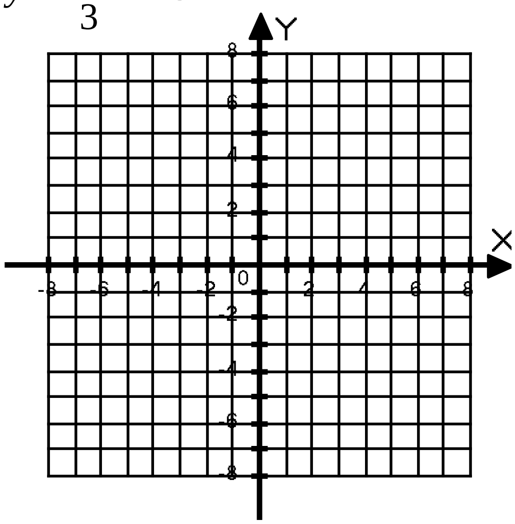
1) $y = \frac{2}{3}x + 1$



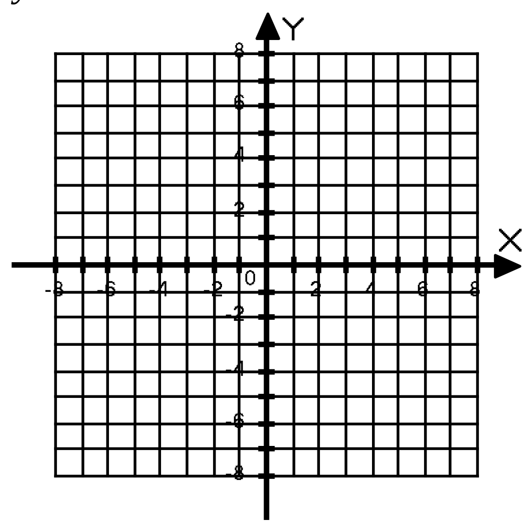
2) $y = \frac{1}{4}x - 2$



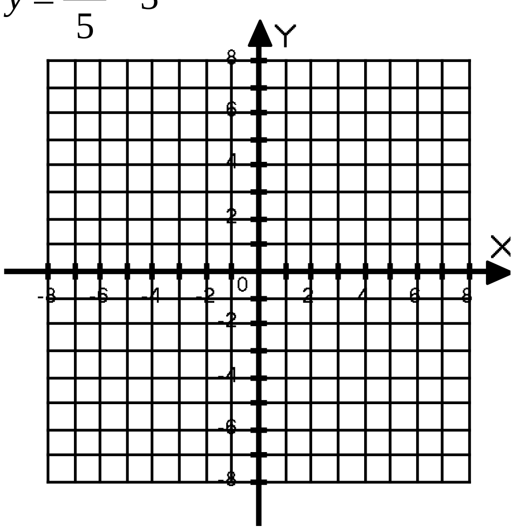
3) $y = \frac{-2}{3}x + 5$



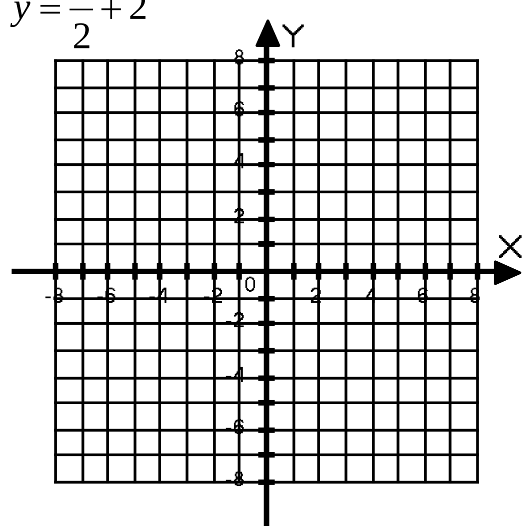
4) $y = 3x$



5) $y = \frac{2x}{5} - 3$



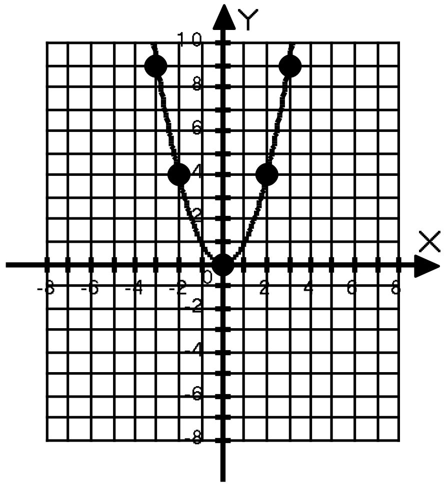
6) $y = \frac{x}{2} + 2$



QUADRATIC EQUATIONS

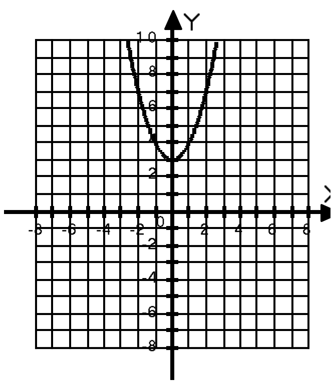
$y = x^2$

X	Y
3	9
2	4
0	0
-2	4
-3	9

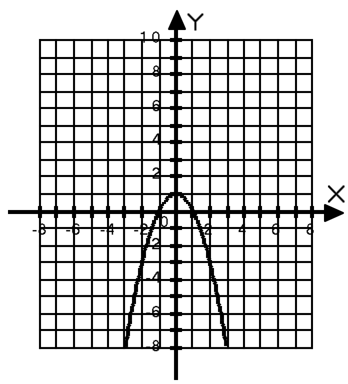


1. The constant is the y-intercept (0).

2. Positive x^2, graph goes up. Negative x^2, graph goes down.

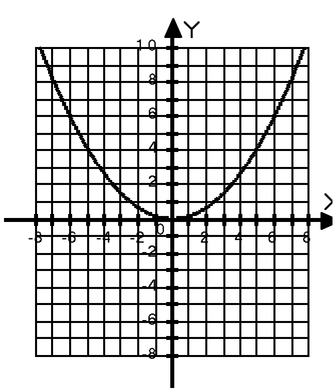


$y = x^2 + 3$

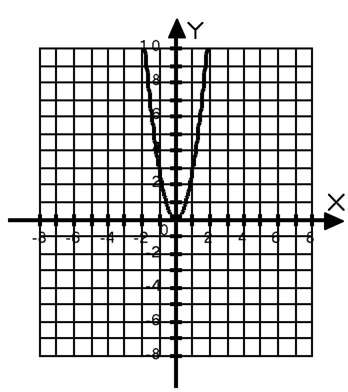


$y = -x^2 + 1$

3. The number in front of the x^2 (coefficient), tells how fat the parabola is.
   FRACTIONS ARE FATTER!!! (y goes up slower)
   As the absolute value of the coefficient gets larger, the parabola gets skinnier.



$y = \frac{1}{6}x^2$

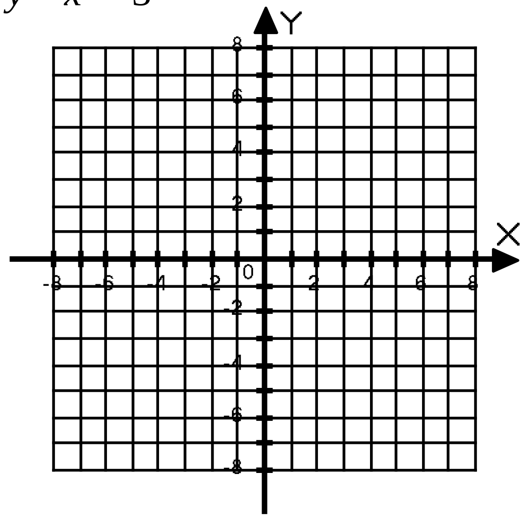


$y = 3x^2$

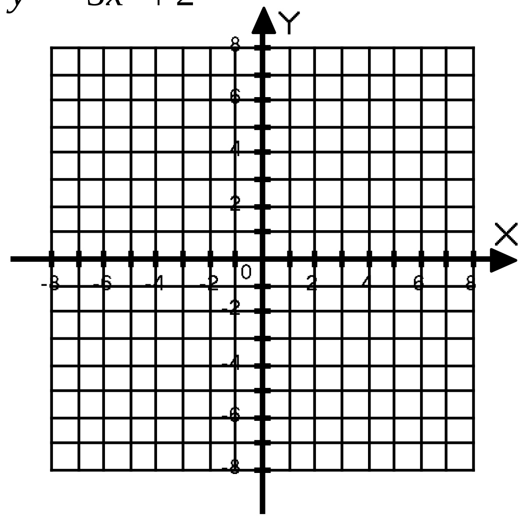
QUADRATIC EQUATIONS

Sketch the following quadratic equations:

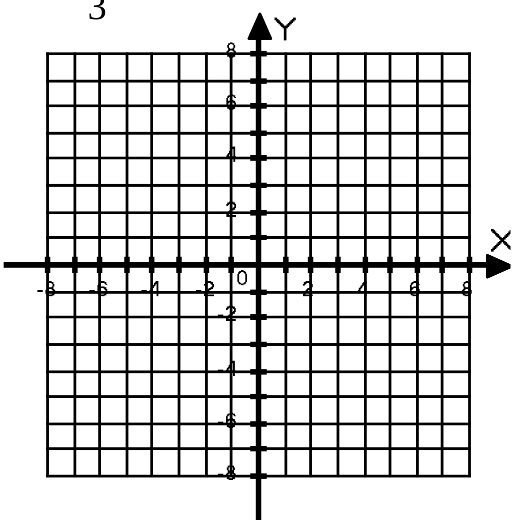
1) $y = x^2 - 3$



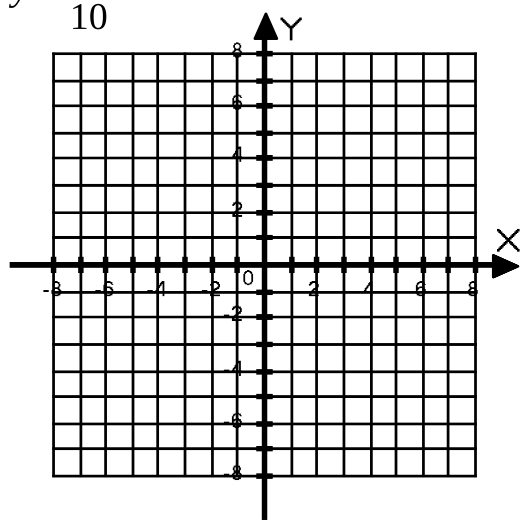
2) $y = -5x^2 + 2$



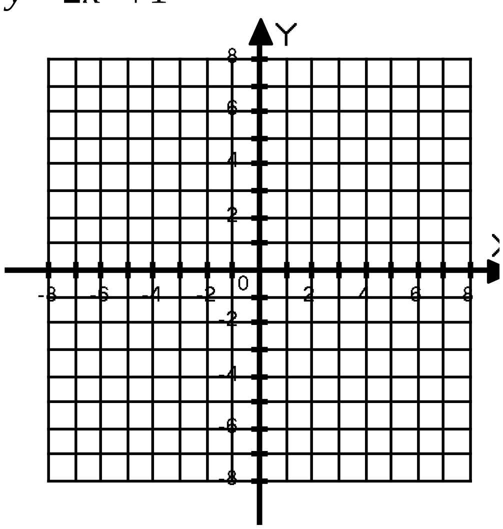
3) $y = -\frac{1}{3}x^2$



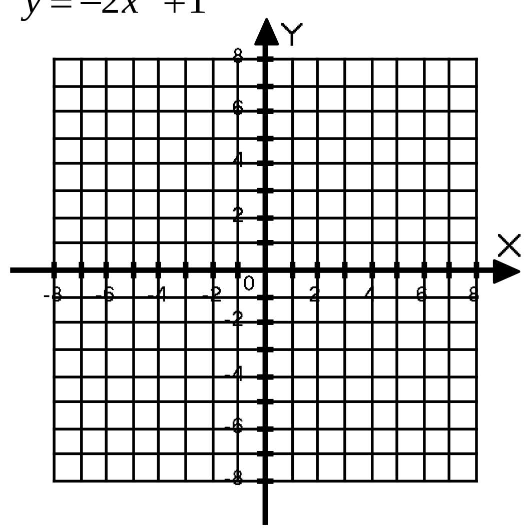
4) $y = \frac{1}{10}x^2 - 4$



5) $y = 2x^2 + 1$



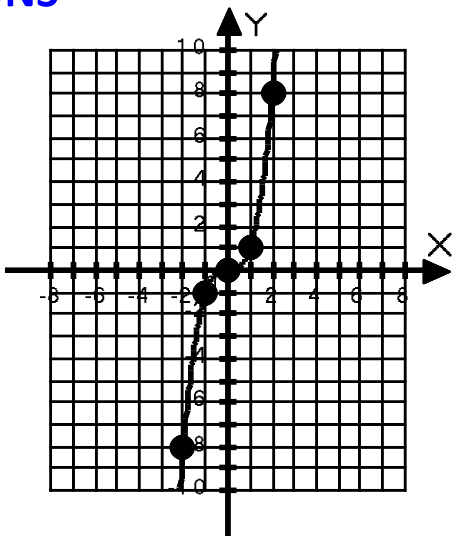
6) $y = -2x^2 + 1$



CUBIC EQUATIONS

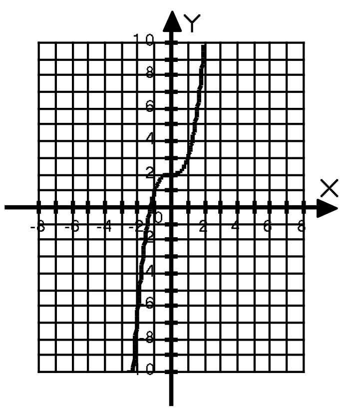
$y = x^3$

X	Y
2	8
1	1
0	0
-1	-1
-2	-8

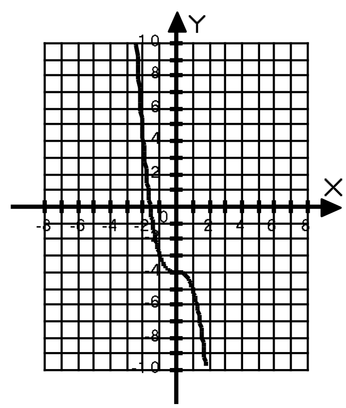


1. The constant is the y-intercept (0).

2. Positive x^3, graph goes up to the right. Negative x^3, graph goes up to the left.

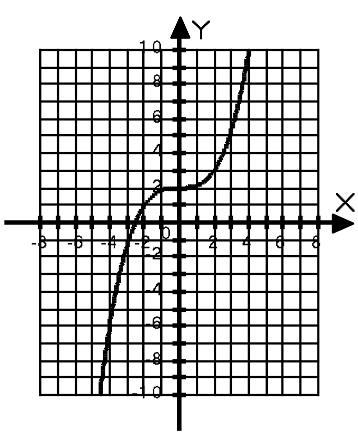


$y = x^3 + 2$

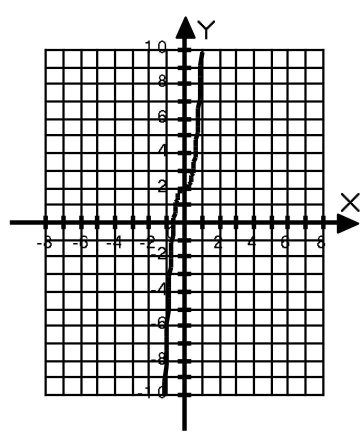


$y = -x^3 - 4$

3. The number in front of the x^3 (coefficient), tells how fast (or slow) the graph goes up and down.
   As the absolute value of the coefficient gets larger, the graph moves faster.



$y = \frac{1}{8}x^3 + 2$

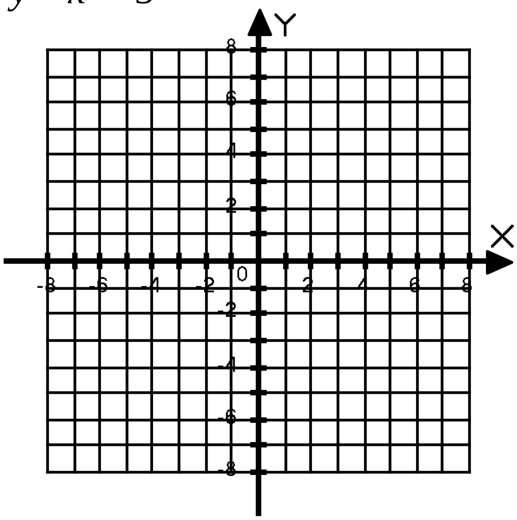


$y = 8x^3 + 2$

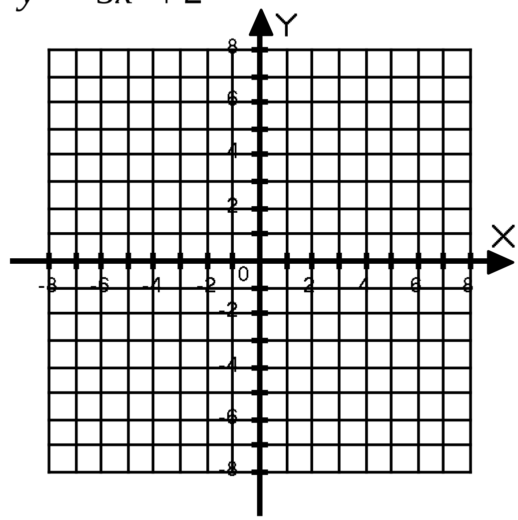
CUBIC EQUATIONS

Sketch the following cubic equations:

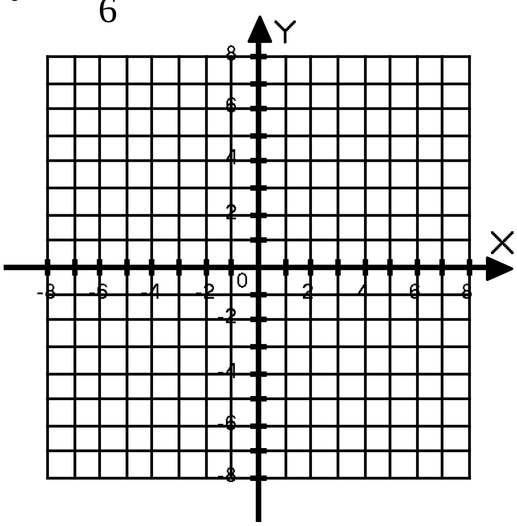
1) $y = x^3 - 3$



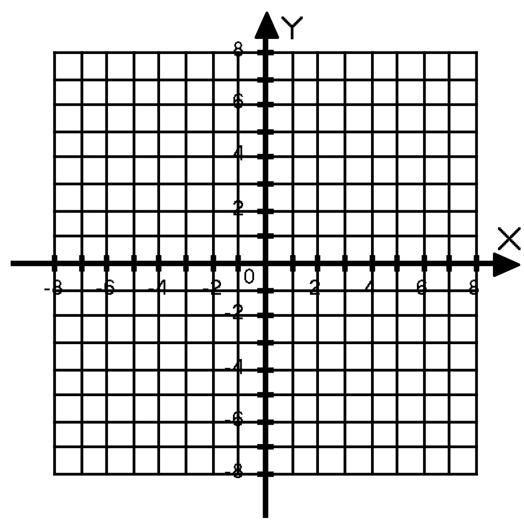
2) $y = -5x^3 + 2$



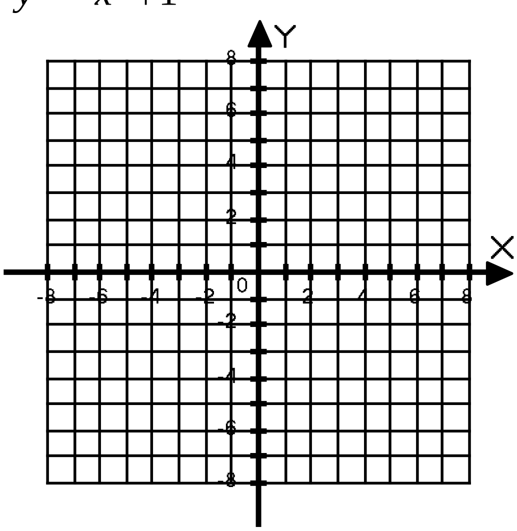
3) $y = -\frac{1}{6}x^3$



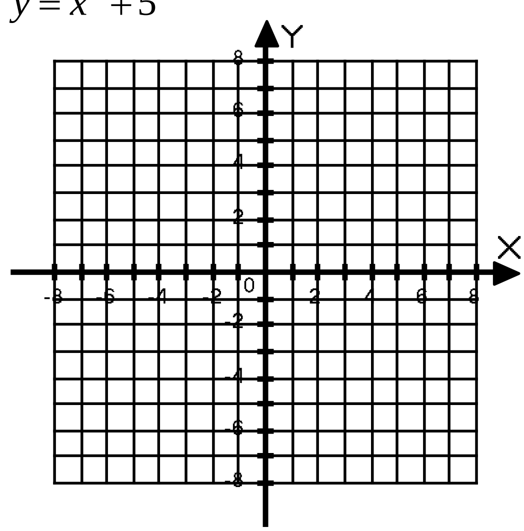
4) $y = 2x^3 - 1$



5) $y = -x^3 + 1$



6) $y = x^3 + 5$



MORE THAN A GLANCE!

If you need more information…we can look at the Line of Symmetry and the "Zeroes".

The Line of Symmetry

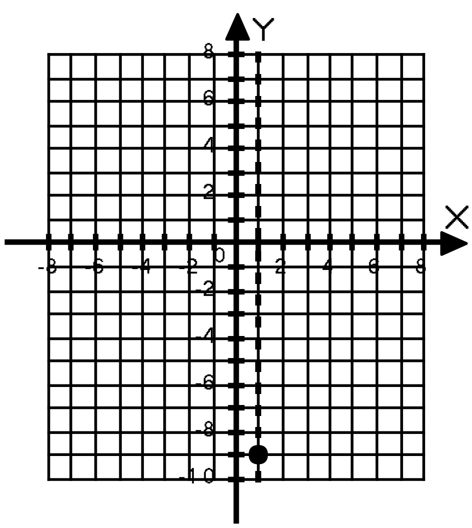
The graph of the quadratic equation (the parabola) has a line of symmetry. We can find the line of symmetry and the vertex of the parabola by using $x = \frac{-b}{2a}$. After finding x, substitute the value of x in the equation to find y. The point (x,y) will be the vertex of the parabola.

Example:

$$y = x^2 - 2x - 8$$

$$a = 1,\ b = -2,\ c = -8$$

The Line of Symmetry: $x = \frac{-b}{2a}$ $\longrightarrow$ $x = \frac{-(-2)}{2(1)} = \frac{2}{2} = 1$ $\longrightarrow$ $x = 1$

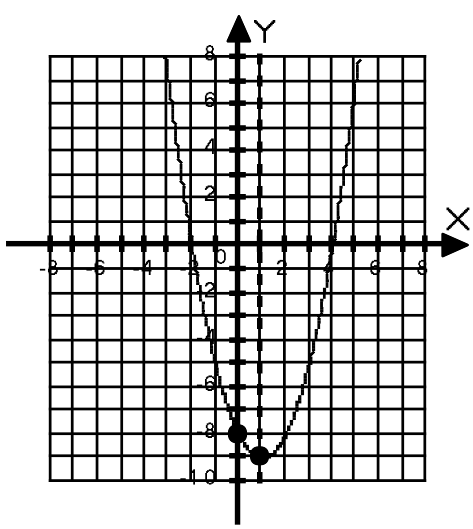


The dotted line (x=1) is the Line of Symmetry.
It will split the parabola down the middle.

To find the vertex of the parabola, plug in 1 for the x value in the original equation to find y. This will give the y value on the dotted line.

$$y = (1)^2 - 2(1) - 8 = -9$$

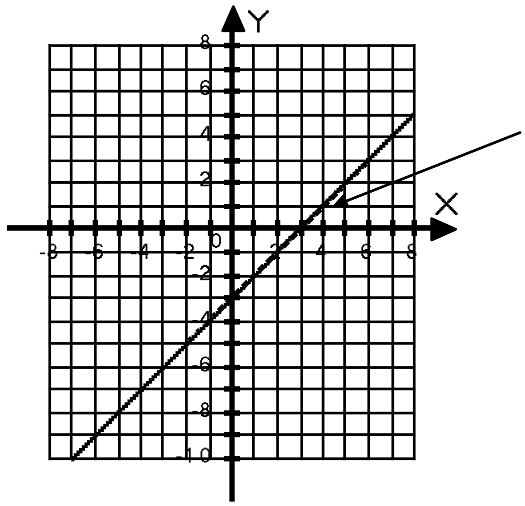
Therefore, the vertex is at the point (1,-9).



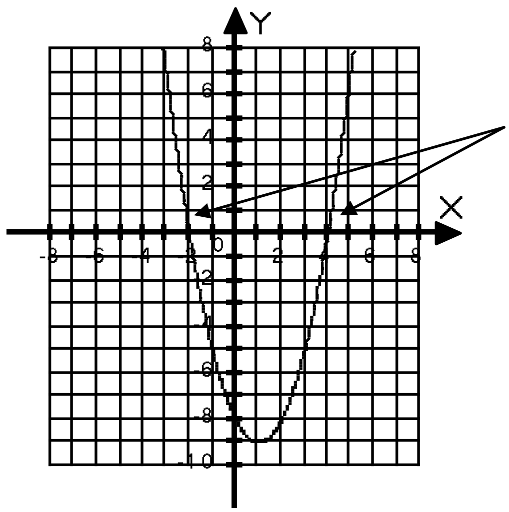
Looking at the constant in the equation, we know the y-intercept is at -8. The coefficient of x^2 is positive, so the parabola goes upward.

The “Zeroes”

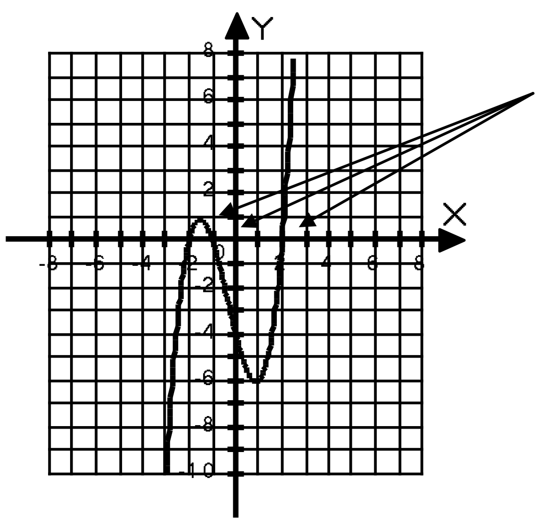
The “Zeroes” are the x-intercepts. It’s the value of x when $y = 0$.



3 is the x-intercept.



-2 and 4 are the x-intercepts.



-2, -1, and 2 are the x-intercepts.

http://www.mathopenref.com/cubicexplorer.html