1.2 Graphs of Equations in Two Variables

Finding x and y intercepts from an equation

To find the x-intercept, put in a zero for y and solve for x.
To find the y-intercept, put in a zero for x and solve for y.

EXAMPLE: Find the intercepts given $4x + y^2 = 4$.

x-int: put in a zero for y and solve for x

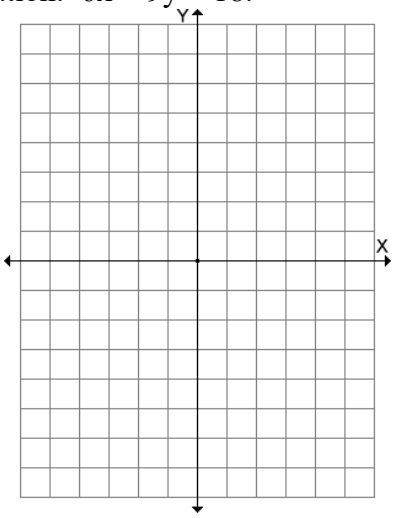
y-int: put in a zero for x and solve for y.

EXAMPLE: Find the intercepts given $y = |x - 4| - 5$.

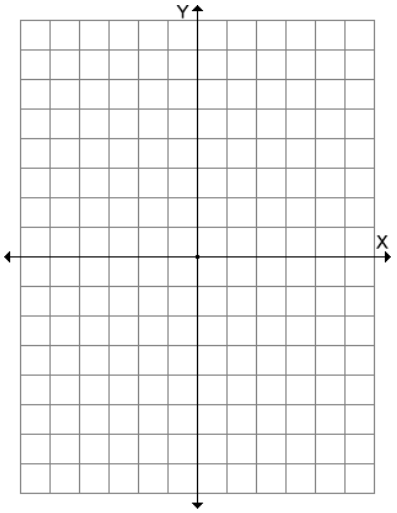
x-int: put in a zero for y and solve for x

y-int: put in a zero for x and solve for y.

EXAMPLE: Find the x and y intercepts and use them to graph the following equation: $6x + 9y = 18$.

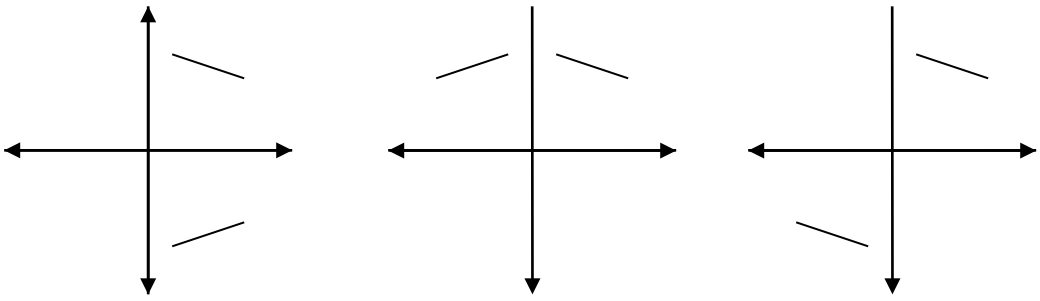


EXAMPLE: Find the x and y intercepts and use them to graph the following equation: $6x - 3y + 15 = 0$.



Symmetry

Think of symmetry as a fold line. If a graph can be folded on top of itself and everything overlaps, then it has symmetry. The fold line that allows this to happen is called the line of symmetry. Below is the three types of symmetry that is possible.

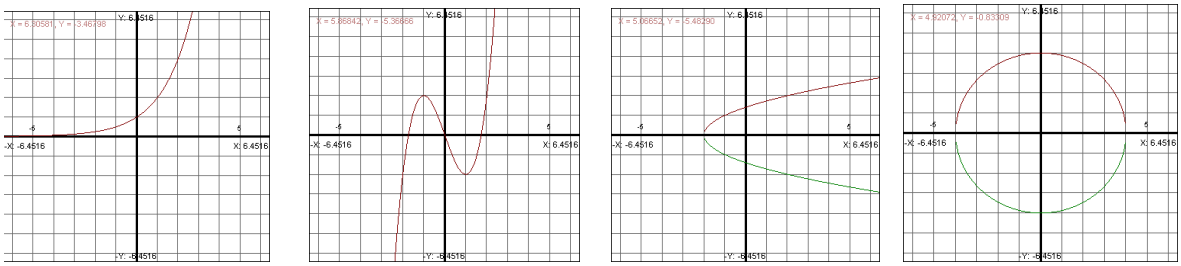


x – axis symmetry y-axis symmetry origin symmetry

Looking at the above drawings we can come up with relationships. Let's begin with a point (x, y).

Two points symmetric about the x-axis would be (x, y) and (x, -y).
Two points symmetric about the y-axis would be (x, y) and (-x, y).
Two points symmetric about the origin would be (x, y) and (-x, -y).

EXAMPLE: Determine what kind of symmetry each graph has.



How to test for symmetry without graphing

x-axis: Replace y with –y in the original equation. If it simplifies to the original equation, it has x-axis symmetry.

y-axis: Replace x with –x in the original equation. If it simplifies to the original equation, it has y-axis symmetry.

.

origin: Replace x with –x and y by -y in the original equation. If it simplifies to the original equation, it has origin symmetry.

EXAMPLE: Test the following equation for symmetry: $4x + y^2 = 4$ and find the intercepts.

x-int: Put a zero in for y and solve for x.

y-int: Put a zero in for x and solve for y.

$4x + y^2 = 4$

x-axis: Replace the y with –y in the original equation.

y-axis: Replace x with –x and simplify.

Origin: Replace x with –x and y with –y.

EXAMPLE: Test the following equation for symmetry: $y = x^2 - 5x$ and find the intercepts.

x-int: Put a zero in for y and solve for x.

y-int: Put a zero in for x and solve for y.

$y = x^2 - 5x$

x-axis: Replace the y with –y in the original equation.

y-axis: Replace x with –x and simplify.

Origin: Replace x with –x and y with –y.

EXAMPLE: Test the following equation for symmetry: $y = x^3 - 4x$ and find the intercepts.

x-int: Put a zero in for y and solve for x.

y-int: Put a zero in for x and solve for y.

$y = x^3 - 4x$

x-axis: Replace the y with –y in the original equation.

y-axis: Replace x with –x and simplify.

Origin: Replace x with –x and y with –y.