

P3 – Points of Intersection

A **point of intersection** of the graphs of two equations is a point that satisfies both equations. You can find the points of intersection of two graphs by solving their equations simultaneously.

Example 5 Find all points of intersection of the graphs of $x^2 - y = 3$ and $x - y = 1$.

$$\begin{aligned}x^2 - y &= 3 & x - y &= 1 \\y &= x^2 - 3 & y &= x - 1\end{aligned}$$

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

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

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

$$(x - 2)(x + 1) = 0$$

$$x - 2 = 0 \quad x + 1 = 0$$

$$x = 2 \quad x = -1$$

when $x = -1$

$$y = (-1) - 1$$

$$y = -2$$

$$(-1, -2)$$

when $x = 2$

$$y = (2) - 1$$

$$y = 1$$

$$(2, 1)$$

HW: Do These

In Exercises 61–68, find the points of intersection of the graphs of the equations.

61. $x + y = 2$

$$2x - y = 1$$

63. $x^2 + y = 6$

$$x + y = 4$$

62. $2x - 3y = 13$

$$5x + 3y = 1$$

64. $x = 3 - y^2$

$$y = x - 1$$

Try These

65. $x^2 + y^2 = 5$

$$x - y = 1$$

67. $y = x^3$

$$y = x$$

66. $x^2 + y^2 = 25$

$$2x + y = 10$$

68. $y = x^3 - 4x$

$$y = -(x + 2)$$