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Chapter 4 and 5 Test — March 07, 2018

Continue §8.6 Systems of Nonlinear Equations (p.123)

#38 The difference of two numbers is 2

$x - y = 2$

The sum of their squares is 10

$x^2 + y^2 = 10$

Find the numbers

$\begin{cases} x - y = 2 & \boxed{1} \\ x^2 + y^2 = 10 & \boxed{2} \end{cases}$ → solve for x and substitute

$\boxed{1}$ $x - y = 2$

$x = 2 + y$

$\boxed{x = 2 + y}$ → Find this equation to use here

$x = 2 + (-3)$ $\quad x = -1$ $\quad (-1, -3)$

$x = 2 + 1$ $\quad x = 3$ $\quad (3, 1)$

$\boxed{2}$ $x^2 + y^2 = 10$

$(2+y)^2 + y^2 = 10$

$(2+y)(2+y) + y^2 = 10$

$4 + 2y + 2y + y^2 + y^2 = 10$

$2y^2 + 4y + 4 = 10 - 10$

$2y^2 + 4y + 4 - 10 = 10 - 10$

$2y^2 + 4y - 6 = 0$

$2(y^2 + 2y - 3) = 0$

$2(y+3)(y-1) = 0$

$\boxed{2 = 0}$ NO Solution

$\boxed{y = -3}$ $(?, -3)$

$\boxed{y = 1}$ $(?, 1)$

Check:

	$x - y = 2$	$x^2 + y^2 = 10$
$(-1, -3)$ ✓	$-1 - (-3) = 2$	$(-1)^2 + (-3)^2 = 10$
	$2 = 2$ ✓	$10 = 10$ ✓
$(3, 1)$ ✓	$3 - 1 = 2$	$3^2 + 1^2 = 10$
	$2 = 2$ ✓	$10 = 10$ ✓

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$4 + 2y + y \cdot 2 + y^2 + y^2 = 10$

$2y^2 + 4y + 4 = 10 - 10$

$2y^2 + 4y + 4 - 10 = 10 - 10$

$2y^2 + 4 - 6 = 0$

~~$2(y^2 + 2y - 3) =$~~

$2(y^2 + 2y - 3) = 0$

$2(y+3)(y-1) = 0$

$\boxed{2 = 0}$ No Solution

$\boxed{y = -3}$ $(?, -3)$

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$\boxed{x = 2 + y}$ → Find this equation to use here

$x = 2 + (-3)$

$x = -1$

$(-1, -3)$

$x = 2 + 1$

$x = 3$

$(3, 1)$

Check:

	$x - y = 2$	$x^2 + y^2 = 10$
$(-1, -3)$ ✓	$-1 - (-3) = 2$ $2 = 2$ ✓	$(-1)^2 + (-3)^2 = 10$ $10 = 10$ ✓
$(3, 1)$ ✓	$3 - 1 = 2$ $2 = 2$ ✓	$3^2 + 1^2 = 10$ $10 = 10$ ✓