

1. $y = x^2 - 5x + 2$
 $4x - y = 12$
SUBSTITUTION

STEP 1: START WITH EQUATION WITH SMALLEST POWERS AND SOLVE FOR ONE OF THE VARIABLES

$4x - y = 12$
 $4x - 12 = y$

STEP 2: NOW SUBSTITUTE THIS INTO THE OTHER EQUATION

$y = x^2 - 5x + 2$
 $4x - 12 = x^2 - 5x + 2$

STEP 3: NOW SOLVE

$0 = x^2 - 5x - 4x + 2 + 12$
 $0 = x^2 - 9x + 14$
 $0 = (x-2)(x-7)$
 $x-2=0 \quad x-7=0$
 $x=2 \quad x=7$

STEP 4: NOW PLUG THESE VALUES INTO EQUATION FROM STEP 1

$x=2$	$x=7$
$y = 4x - 12$	$y = 4x - 12$
$y = 4(2) - 12$	$y = 4(7) - 12$
$y = 8 - 12$	$y = 28 - 12$
$y = -4$	$y = 16$
$(2, -4)$	$(7, 16)$

2. $y = x^2 - 3x + 7$
 $y = x^2 + x + 3$

① $y = x^2 + x + 3$

② $y = x^2 - 3x + 7$

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

$x + 3 = -3x + 7$

$x + 3x = 7 - 3$
 $4x = 4$

$\frac{4x}{4} = \frac{4}{4}$
 $x = 1$

④ $x = 1$

$y = x^2 + x + 3$

$y = (1)^2 + (1) + 3$

$y = 1 + 1 + 3$

$y = 5$

$(1, 5)$

3. $x^2 + y^2 = 26$
 $7x - y = 2$

① $7x - y = 2$

$7x - 2 = y$

② $x^2 + y^2 = 26$

$x^2 + (7x - 2)^2 = 26$

③ $x^2 + (7x - 2)(7x - 2) = 26$

$x^2 + 49x^2 - 14x - 14x + 4 = 26$

$50x^2 - 28x + 4 - 26 = 0$

$50x^2 - 28x - 22 = 0$

$25x^2 - 14x - 11 = 0$ $KW \#$

$(25x + 11)(x - 1) = 0$

$25x + 11 = 0 \quad x - 1 = 0$

$25x = -11$

$x = 1$

$x = -\frac{11}{25}$

④ $x = -\frac{11}{25} \quad x = 1$

$y = 7x - 2$

$y = 7x - 2$

$y = 7(-\frac{11}{25}) - 2$

$y = 7(1) - 2$

$y = -\frac{77}{25} - \frac{50}{25}$

$y = 5$

$y = -\frac{127}{25}$

$(1, 5)$

$(-\frac{11}{25}, -\frac{127}{25})$

4. $x^2 + y^2 = 5$
 $xy = 2$

① $xy = 2$

$\frac{xy}{x} = \frac{2}{x}$

$y = \frac{2}{x}$

② $x^2 + y^2 = 5$

$x^2 + (\frac{2}{x})^2 = 5$

③ $x^2 + \frac{4}{x^2} = 5$

$x^2(x^2) + x^2(\frac{4}{x^2}) = 5(x^2)$

$x^4 + 4 = 5x^2$

$x^4 - 5x^2 + 4 = 0$

$u^2 - 5u + 4 = 0$

$(u-1)(u-4) = 0$

$u-1=0 \quad u-4=0$

$u=1 \quad u=4$

$x^2=1 \quad x^2=4$

$x = \pm\sqrt{1} \quad x = \pm\sqrt{4}$

$x = \pm 1 \quad x = \pm 2$

④

$x = -1$

$x = 1$

$x = -2$

$x = 2$

$y = \frac{2}{x}$

$y = \frac{2}{x}$

$y = \frac{2}{x}$

$y = \frac{2}{x}$

$y = \frac{2}{-1}$

$y = \frac{2}{1}$

$y = \frac{2}{-2}$

$y = \frac{2}{2}$

$y = -2$

$y = 2$

$y = -1$

$y = 1$

$(-1, -2) \quad (1, 2)$

$(-2, -1) \quad (2, 1)$