Solutions

1. $y = x^2 + x - 2$ ①
$y = -x + 1$ ②

② $y = -x + 1$ sub. in ①

① $y = x^2 + x - 2$
$-x + 1 = x^2 + x - 2$
$0 = x^2 + x + x - 2 - 1$
$0 = x^2 + 2x - 3$
$0 = (x-1)(x+3)$
$x = 1 \quad x = -3$
sub in ②

② $y = -x + 1$ $\quad y = -x + 1$
$x = 1 \quad x = -3$
$y = -1 + 1 \quad y = -(-3) + 1$
$y = 0 \quad y = 3 + 1$
$y = 4$
$(1, 0) \quad (-3, 4)$

2. $y = x^2 - 6x + 9$ ①
$y + x = 5$ ②

② $y + x = 5$
$y = -x + 5$ sub. in ①

① $y = x^2 - 6x + 9$
$-x + 5 = x^2 - 6x + 9$
$0 = x^2 - 6x + x + 9 - 5$
$0 = x^2 - 5x + 4$
$0 = (x-1)(x-4)$
$x = 1 \quad x = 4$
sub. in ②

② $y + x = 5$ $\quad y + x = 5$
$x = 1 \quad x = 4$
$y + 1 = 5 \quad y + 4 = 5$
$y = 5 - 1 \quad y = 5 - 4$
$y = 4 \quad y = 1$
$(1, 4) \quad (4, 1)$

3. $y - 30 = 12x$ ①
$y = x^2 + 11x - 12$ ②

① $y - 30 = 12x$
$y = 12x + 30$
sub. in ②

② $y = x^2 + 11x - 12$
$12x + 30 = x^2 + 11x - 12$
$0 = x^2 + 11x - 12x - 12 - 30$
$0 = x^2 - 1x - 42$
$0 = (x+6)(x-7)$
$x = -6 \quad x = 7$
Sub. in ①

① $y - 30 = 12x$
$x = -6$
$y - 30 = 12(-6)$
$y - 30 = -72$
$y = -72 + 30$
$y = -42$
$(-6, -42)$

① $y - 30 = 12x$
$x = 7$
$y - 30 = 12(7)$
$y - 30 = 84$
$y = 84 + 30$
$y = 114.$
$(7, 114)$

4. $y = x^2 - 2x - 6$ ①
$y = 4x + 10$ ②

② $y = 4x + 10$
sub. in ①

① $y = x^2 - 2x - 6$
$4x + 10 = x^2 - 2x - 6$
$0 = x^2 - 2x - 4x - 6 - 10$
$0 = x^2 - 6x - 16$
$0 = (x+2)(x-8)$
$x = -2 \quad x = 8$
sub in ②

② $y = 4x + 10$
$x = -2$
$y = 4(-2) + 10$
$y = -8 + 10$
$y = 2$
$(-2, 2)$

② $y = 4x + 10$
$x = 8$
$y = 4(8) + 10$
$y = 32 + 10$
$y = 42$
$(8, 42)$

Solutions

5. $y = 3x - 20$ ① $y = -x^2 + 34$ ②

① $y = 3x - 20$ sub. in ②

② $y = -x^2 + 34$

$3x - 20 = -x^2 + 34$

$x^2 + 3x - 20 - 34 = 0$

$x^2 + 3x - 54 = 0$

$(x + 9)(x - 6) = 0$

$x = -9 \quad x = 6$

sub. in ①

① $y = 3x - 20$

$x = -9$

$y = 3(-9) - 20$

$y = -27 - 20$

$y = -47$

$(-9, -47)$

① $y = 3x - 20$

$x = 6$

$y = 3(6) - 20$

$y = 18 - 20$

$y = -2$

$(6, -2)$

6. $y = x^2 + 7x + 100$ ① $y + 10x = 30$ ②

② $y + 10x = 30$

$y = -10x + 30$

sub. in ①

① $y = x^2 + 7x + 100$

$-10x + 30 = x^2 + 7x + 100$

$0 = x^2 + 7x + 10x + 100 - 30$

$0 = x^2 + 17x + 70$

$0 = (x + 7)(x + 10)$

$x = -7 \quad x = -10$

sub. in ②

② $y + 10x = 30$

$x = -7$

$y + 10(-7) = 30$

$y - 70 = 30$

$y = 30 + 70$

$y = 100$

$(-7, 100)$

② $y + 10x = 30$

$x = -10$

$y + 10(-10) = 30$

$y - 100 = 30$

$y = 30 + 100$

$y = 130$

$(-10, 130)$

Solutions

7. $-x^2-x+19=y$ ①
$x=y+80$ ②

② $x=y+80$
$x-80=y$

Sub. in ①

① $-x^2-x+19=y$
$-x^2-x+19=x-80$
$0=x^2+x+x-80-19$
$0=x^2+2x-99$
$0=(x+11)(x-9)$
$x=-11 \quad x=9$

Sub. in ②

② $x=y+80$
$x=-11$
$-11=y+80$
$-11-80=y$
$-91=y$

$(-11,-91)$

② $x=y+80$
$x=9$
$9=y+80$
$9-80=y$
$-71=y$

$(9,-71)$

8. $3x-y=-2$ ①
$2x^2=y$ ②

① $3x-y=-2$
$3x+2=y$

sub. in ②

② $2x^2=y$
$2x^2=3x+2$
$2x^2-3x-2=0$
$(x+\frac{1}{2})(x-\frac{4}{2})=0$

$\frac{1}{1}x\frac{-4}{2}=-4$
$\frac{1}{1}+\frac{-4}{2}=-3$

$(2x+1)(x-2)=0$
$2x+1=0 \quad x=2$
$2x=-1$
$\frac{2x}{2}=\frac{-1}{2}$
$x=-\frac{1}{2}$

Sub. in ①

① $3x-y=-2$
$x=-\frac{1}{2}$

$3(-\frac{1}{2})-y=-2$
$-\frac{3}{2}-y=-2$
$-\frac{3}{2}+\frac{2}{1}=y$
$-\frac{3}{2}+\frac{4}{2}=y$
$\frac{1}{2}=y$

$(-\frac{1}{2},\frac{1}{2})$

① $3x-y=-2$
$x=2$

$3(2)-y=-2$
$6-y=-2$
$6+2=y$
$8=y$

$(2,8)$

Solutions

9. $x^2-x-y=6$ ①
$2x-y=2$ ②

② $2x-y=2$
$2x-2=y$
sub. in ①

① $x^2-x-y=6$
$x^2-x-(2x-2)=6$
$x^2-x-2x+2=6$
$x^2-3x+2-6=0$
$x^2-3x-4=0$
$(x+1)(x-4)=0$
$x=-1 \quad x=4$
sub. in ②

$x=-1$
② $2x-y=2$
$2(-1)-y=2$
$-2-y=2$
$-2-2=y$
$-4=y$
$(-1,-4)$

$x=4$
② $2x-y=2$
$2(4)-y=2$
$8-y=2$
$8-2=y$
$6=y$
$(-4, 6)$

10. $y=x^2-x-6$ ①
$y=x-3$ ②

② $y=x-3$
sub. in ①

① $y=x^2-x-6$
$x-3=x^2-x-6$
$0=x^2-x-x-6+3$
$0=x^2-2x-3$
$0=(x+1)(x-3)$
$x=-1 \quad x=3$
sub. in ②

② $y=x-3$
$x=-1$
$y=-1-3$
$y=-4$
$(-1,-4)$

② $y=x-3$
$x=3$
$y=3-3$
$y=0$
$(3,0)$