

$$y = x^2 + 6x + 11 = f(x)$$

$$\text{Solve } y = 0$$

$$x^2 + 6x + 11 = 0$$

$$x^2 + 6x = -11$$

$$x^2 + 6x + 3^2 = -11 + 9$$

$$(x+3)^2 = -2$$

$$x+3 = \pm i\sqrt{2}$$

$$x = 3 \pm \sqrt{2}i$$

Solve equation

Manipulate expression

write $f(x)$ in the form $a(x-h)^2+k$

$$x^2 + 6x + 11$$

$$= x^2 + 6x + 3^2 - 3^2 + 11$$

$$= (x+3)^2 + 2$$

$$\sqrt{-2} = i\sqrt{2}$$