

## Solving $x^2 + bx + c = 0$ quadratic equations by factors - All Four cases

### 1. Both factors positive

$$x^2 + bx + c \implies (x + p)(x + q)$$

**a)**  $x^2 + 3x + 2 = 0$

$$(x + 1)(x + 2); x = -1 \text{ or } -2$$

**b)**  $x^2 + 5x + 6 = 0$

$$(x + 2)(x + 3); x = -2 \text{ or } -3$$

**c)**  $x^2 + 6x + 5 = 0$

$$(x + 1)(x + 5); x = -1 \text{ or } -5$$

**d)**  $x^2 + 7x + 12 = 0$

$$(x + 3)(x + 4); x = -3 \text{ or } -4$$

**e)**  $x^2 + 11x + 28 = 0$

$$(x + 4)(x + 7); x = -4 \text{ or } -7$$

**f)**  $x^2 + 14x + 45 = 0$

$$(x + 5)(x + 9); x = -5 \text{ or } -9$$

### 2. Both factors negative

$$x^2 - bx + c \implies (x - p)(x - q)$$

**a)**  $x^2 - 3x + 2 = 0$

$$(x - 1)(x - 2); x = 1 \text{ or } 2$$

**b)**  $x^2 - 6x + 5 = 0$

$$(x - 1)(x - 5); x = 1 \text{ or } 5$$

**c)**  $x^2 - 9x + 14 = 0$

$$(x - 2)(x - 7); x = 2 \text{ or } 7$$

**d)**  $x^2 - 7x + 12 = 0$

$$(x - 3)(x - 4); x = 3 \text{ or } 4$$

**e)**  $x^2 - 11x + 24 = 0$

$$(x - 3)(x - 8); x = 3 \text{ or } 8$$

**f)**  $x^2 - 11x + 30 = 0$

$$(x - 5)(x - 6); x = 5 \text{ or } 6$$

### 3. Mixed signs (positive dominants) $x^2 + bx - c \implies (x + \text{big})(x - \text{small})$

**a)**  $x^2 + 4x - 5 = 0$

$$(x + 5)(x - 1); x = -5 \text{ or } 1$$

**b)**  $x^2 + 6x - 7 = 0$

$$(x + 7)(x - 1); x = -7 \text{ or } 1$$

**c)**  $x^2 + 6x - 16 = 0$

$$(x + 8)(x - 2); x = -8 \text{ or } 2$$

**d)**  $x^2 + 6x - 27 = 0$

$$(x + 9)(x - 3); x = -9 \text{ or } 3$$

**e)**  $x^2 + 7x - 44 = 0$

$$(x + 11)(x - 4); x = -11 \text{ or } 4$$

**f)**  $x^2 + 8x - 65 = 0$

$$(x + 13)(x - 5); x = -13 \text{ or } 5$$

4. **Mixed signs (negative dominants)**  $x^2 - bx - c \implies (x - \text{big})(x + \text{small})$

**a)**  $x^2 - 4x - 5 = 0$

$(x + 1)(x - 5); x = -1 \text{ or } 5$

**b)**  $x^2 - 5x - 14 = 0$

$(x + 2)(x - 7); x = -2 \text{ or } 7$

**c)**  $x^2 - 5x - 24 = 0$

$(x + 3)(x - 8); x = -3 \text{ or } 8$

**d)**  $x^2 - 5x - 36 = 0$

$(x + 4)(x - 9); x = -4 \text{ or } 9$

**e)**  $x^2 - 6x - 55 = 0$

$(x + 5)(x - 11); x = -5 \text{ or } 11$

**f)**  $x^2 - 6x - 91 = 0$

$(x + 7)(x - 13); x = -7 \text{ or } 13$

5. **Classify what case is involved and solve**

**a)**  $x^2 - 1x - 2 = 0$

$(x + 1)(x - 2); x = -1 \text{ or } 2$

**b)**  $x^2 + 2x - 3 = 0$

$(x + 3)(x - 1); x = -3 \text{ or } 1$

**c)**  $x^2 - 12x + 35 = 0$

$(x - 5)(x - 7); x = 5 \text{ or } 7$

**d)**  $x^2 - 6x - 55 = 0$

$(x + 5)(x - 11); x = -5 \text{ or } 11$

**e)**  $x^2 - 14x + 13 = 0$

$(x - 1)(x - 13); x = 1 \text{ or } 13$

**f)**  $x^2 + 6x - 7 = 0$

$(x + 7)(x - 1); x = -7 \text{ or } 1$

**g)**  $x^2 - 14x + 33 = 0$

$(x - 3)(x - 11); x = 3 \text{ or } 11$

**h)**  $x^2 + 9x - 22 = 0$

$(x + 11)(x - 2); x = -11 \text{ or } 2$

**i)**  $x^2 - 12x - 13 = 0$

$(x + 1)(x - 13); x = -1 \text{ or } 13$

**j)**  $x^2 - 7x + 10 = 0$

$(x - 2)(x - 5); x = 2 \text{ or } 5$

**k)**  $x^2 - 4x - 21 = 0$

$(x + 3)(x - 7); x = -3 \text{ or } 7$

**l)**  $x^2 + 3x - 10 = 0$

$(x + 5)(x - 2); x = -5 \text{ or } 2$

**m)**  $x^2 - 16x + 55 = 0$

$(x - 5)(x - 11); x = 5 \text{ or } 11$

**n)**  $x^2 + 4x - 21 = 0$

$(x + 7)(x - 3); x = -7 \text{ or } 3$

**o)**  $x^2 - 8x + 7 = 0$

$(x - 1)(x - 7); x = 1 \text{ or } 7$

**p)**  $x^2 + 6x - 55 = 0$

$(x + 11)(x - 5); x = -11 \text{ or } 5$