

Quadratic Equation (QE)

General form

$$ax^2 + bx + c = 0 \quad \textcircled{1}, a \neq 0$$

Q. How to solve $\textcircled{1}$?

A. Two Methods $\left\{ \begin{array}{l} \text{Factoring (Jalsi) Method (FM)} \\ \text{Quadratic Formula (QF)} \end{array} \right.$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Remark $\textcircled{1}$

$$ab = 0 \Rightarrow a = 0 \text{ or } b = 0$$

Exp $(3x - 6)(3 - 2x) = 0$

$$3x - 6 = 0$$

$$\begin{array}{r} +6 \\ +6 \end{array}$$

$$\frac{3x}{3} = \frac{6}{3}$$

$$x = 2$$

or

$$3 - 2x = 0$$

$$\begin{array}{r} -3 \\ -3 \end{array}$$

$$\frac{-2x}{-2} = \frac{-3}{-2}$$

$$x = \frac{3}{2}$$

$\Rightarrow \textcircled{2} \quad x^2 = c \Rightarrow x = \pm \sqrt{c}, c \geq 0$

كيف

$$\sqrt{x^2} = \sqrt{c}$$

$$|x| = \sqrt{c}$$

$$|x| = 7$$

$\Downarrow$

$$x = 7$$

$$|x| = \sqrt{c}$$

$$x = \sqrt{c}$$

or $x = -\sqrt{c}$

$$\Downarrow$$

$$x = 7$$

or $x = -7$

Exp ① $x^2 = 9$ $\Rightarrow x = \pm \sqrt{9} = \pm 3$

② $x^2 = 5$ $\Rightarrow x = \pm \sqrt{5}$

③ $4x^2 = 25$ $\Rightarrow x^2 = \frac{25}{4} \Rightarrow x = \pm \sqrt{\frac{25}{4}}$

$$x^2 = 49$$

$\Downarrow$

$$x = \pm \sqrt{49} = \pm 7$$

$$y^2 = 64$$

$$y = \pm \sqrt{64} = \pm 8$$

51

$$(3x)^2 + 2(3x)(-4) + (-4)^2 = 16$$

$$9x^2 - 24x + 16 = 16$$

$$9x^2 - 24x = 0$$

$$3x[3x - 8] = 0$$

$$3x = 0 \quad | \quad 3x - 8 = 0$$

$$x = 0 \quad | \quad x = \frac{8}{3}$$

4

$$(3x - 4)^2 = 16$$

52

$$3x - 4 = \pm \sqrt{16} = \pm 4$$

$$3x - 4 = 4$$

$$3x = 8$$

$$x = \frac{8}{3}$$

$$3x - 4 = -4$$

$$3x = 0$$

$$x = 0$$

$$= \pm \frac{5}{2}$$

Exp Solve using factoring

Exp solve using factoring

(1)

$$x^2 = 11x - 10$$

$$x^2 - 11x + 10 = 0$$

$$(x+a)(x+b) = 0$$

$$(x-1)(x-10) = 0$$

$$a+b = -11$$

$$ab = 10$$

$$a = -1$$

$$b = -10$$

التأكد من

$$x^2 \stackrel{?}{=} 11x - 10$$

$$(10)^2 \stackrel{?}{=} 11(10) - 10$$

$$100 \stackrel{?}{=} 110 - 10$$

$$x^2 \stackrel{?}{=} 11x - 10$$

$$(1)^2 \stackrel{?}{=} 11(1) - 10$$

$$1 = 11 - 10$$

$$x-1=0$$

$$+1 \quad +1$$

$$x=1$$

or

$$x-10=0$$

$$+10 \quad +10$$

$$x=10$$

$$ab=0 \Rightarrow a=0 \text{ or } b=0$$

(2)

$$(y-3)(y+2) = -4$$

$$y-3 = -4$$

or

$$y+2 = -4$$

$$(y-3)(y+2) + 4 = 0$$

$$y^2 + 2y - 3y - 6 + 4 = 0$$

$$y^2 - y - 2 = 0$$

$$\boxed{3} \boxed{4} = 12$$

$$\uparrow \quad \uparrow$$

$$3 \neq 12$$

$$4 \neq 12$$

$$\boxed{5} \boxed{\quad} = 0$$

$$\uparrow$$

$$\boxed{\quad} \boxed{\quad} = 0$$

$$\uparrow$$

$$1979$$

$$(y+a)(y+b)=0$$

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

$$a+b=-1$$

$$ab=-2$$

$$a=-2$$

$$b=1$$

$$y-2=0$$

$$y=2$$

or

$$y+1=0$$

$$y=-1$$

Check

$$(y-3)(y+2)=-4$$

$$(2-3)(2+2) \stackrel{?}{=} -4$$

$$(-1)(4) = -4 \checkmark$$

check $y=-1$

$$(-1-3)(-1+2) \stackrel{?}{=} -4$$

$$(-4)(1) = -4 \checkmark$$

$$3 \cdot \frac{x}{x} \cdot \frac{x+1}{3x+6} = \frac{3}{x} + \frac{2x+6}{x(3x+6)}$$

$$\frac{x(x+1)}{x(3x+6)} = \frac{3(3x+6)}{x(3x+6)} + \frac{2x+6}{x(3x+6)}$$

multiply by $x(3x+6)$

Multiply by LCD = $x(3x+6)$

$$x(x+1) = 3(3x+6) + 2x+6$$

$$x^2 + x = 9x + 18 + 2x + 6$$

$$x^2 + x - 11x = 24$$

$$x^2 - 10x = 24$$

$$x^2 - 10x - 24 = 0$$

$$(x+a)(x+b) = 0$$

$$(x-12)(x+2) = 0$$

$$x-12=0$$

$$x=12$$

or

$$x+2=0$$

$$x=-2$$

check

$$\frac{x+1}{3x+6} = \frac{3}{x} + \frac{2x+6}{x(3x+6)}$$

check $x=-2$

$$\frac{-2+1}{-6+6} = \frac{3}{-2}$$

check $x=12$

$$\frac{12+1}{36+6} = \frac{3}{12} + \frac{2(12)+6}{12(36+6)} \quad \checkmark$$

$$\frac{13}{42} = \frac{1}{4} + \frac{5}{(12)(42)} \quad \checkmark$$

صفر في المقام
مرفوض
X

$$\frac{13}{42} = \frac{1}{4} + \frac{5}{84} \quad \checkmark$$

$$= \frac{84 + 20}{(4)(84)}$$

$$= \frac{104}{336} = \frac{13}{42}$$

توصية مقادير

$$\frac{a}{b} + \frac{c}{d} = \frac{ad+cb}{bd}$$

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