

Solving One Unknown

$$\textcircled{1} \quad 3x - 7 = 32$$

$$3x = 39 \rightarrow \boxed{x = 13} \quad \checkmark$$

$$\textcircled{2} \quad \frac{x+2}{3} + \frac{2x+1}{5} = 6$$

$$\frac{5(x+2)}{15} + \frac{3(2x+1)}{15} = 6$$

$$\frac{5x+10 + 6x+3}{15} = 6$$

(LINEAR)

$$11x + 13 = 90$$

$$\begin{aligned} 11x &= 77 \\ x &= 7 \end{aligned}$$



$$\textcircled{3} \quad \frac{2}{x} = 2 + \frac{5}{2x} \times 2x \rightarrow 4 = 4x + 5$$

$$\begin{aligned} -1 &= 4x \\ x &= -\frac{1}{4} \end{aligned}$$



$$\textcircled{1} \quad 8x^2 - x \div x$$

$$\begin{aligned} &x(8x-1) \\ &\boxed{x=0, x=\frac{1}{8}} \end{aligned}$$

$$\textcircled{2} \quad 9x^2 - 49 \quad (\text{difference of 2 squares})$$

$$(3x+7)(3x-7)$$

$$\boxed{x = \pm \frac{7}{3}}$$

(FACTORISATION)

$$\textcircled{3} \quad x^2 - 9x + 20 = 0$$

$$(x-5)(x-4)$$

$$\boxed{x=5, x=4}$$



$$\textcircled{4} \quad 8x^2 + 15 = 22x$$

$$8x^2 - 22x + 15 = 0$$

$$(4x-5)(2x-3)$$

$$\boxed{x = \frac{5}{4}, x = \frac{3}{2}}$$



① Completing the square

Take $ax^2 + bx + c = 0 \rightarrow$ completed square form
 $a(x+d)^2 + e = 0$

where

$$d = \frac{b}{2a}$$

$$e = c - \frac{b^2}{4a}$$

$$\textcircled{1} \quad x^2 - 8x = 2$$

$$\begin{aligned} x^2 - 8x - 2 &= 0 \\ (1)(x - \frac{8}{2(1)})^2 + (-2 - \frac{(-8)^2}{4(1)}) &= 0 \end{aligned}$$

$$= (x-4)^2 - 18$$

∴ e

\hookrightarrow
Solve
for x

$$x = 4 \pm \sqrt{18}$$

COMPLETING
THE
SQUARE

$$\textcircled{2} \quad 4x^2 - 3x - 2 = 0$$

$$\begin{aligned} 4\left(x - \frac{3}{2(4)}\right)^2 + \left(-2 - \frac{(-3)^2}{4(4)}\right) &= 0 \\ = 4\left(x - \frac{3}{8}\right)^2 - \frac{41}{16} &= 0 \end{aligned}$$

$$\pm \sqrt{\frac{41}{16}} + \frac{3}{8} = x \quad \hookrightarrow \frac{3 \pm \sqrt{41}}{8}$$

$$\boxed{x = -0.4254, x = 1.1754}$$

①

Solving One Unknown

① General quadratic formulae

Take $ax^2 + bx + c = 0 \rightarrow$ Quadratic equation:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\textcircled{1} \quad x^2 + 8x + 6 = 0$$

$$x = \frac{-8 \pm \sqrt{(8)^2 - (4)(1)(6)}}{2(1)} = \frac{-8 \pm 2\sqrt{10}}{2}$$

$$= -4 \pm \sqrt{10}$$

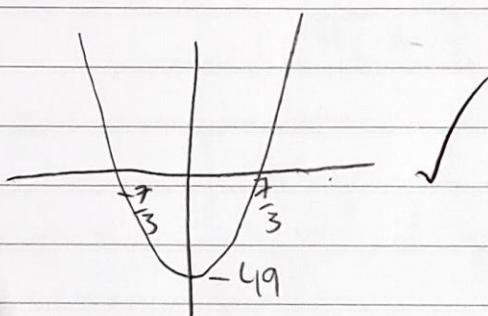
$x = -0.8377$ (+)

$x = -7.1622$ (-)

① Sketch the graphs

$$y = 9x^2 - 49 \rightarrow \text{difference of 2 squares (refer to previous work)}$$

\downarrow
y-intercept $(3x+7)(3x-7)$



$$x = \pm \frac{7}{3}$$

$$x = \pm 2.33$$

$$\textcircled{2} \quad \text{Sketch } y = 4x^2 - 3x - 2 \rightarrow \text{completed square (refer to prev. work)}$$

\downarrow
y-intercept $x = -0.4254, x = 1.1754$

