

Simultaneous Linear Equations

$$\text{Ex 1} \quad \begin{aligned} 5x + 2y &= 19 & (1) \\ 4x + 3y &= 18 & (2) \end{aligned}$$

$$\begin{aligned} (1) \times 3 &\quad 15x + 6y = 57 & (3) \\ (2) \times 2 &\quad 8x + 6y = 36 & (4) \end{aligned}$$

$$(3) - (4) \quad 7x = 21 \quad \text{Sub for } x \text{ in (1)}$$

$$\begin{aligned} x &= \frac{21}{7} & 5(3) + 2y &= 19 \\ x &= 3 & 15 + 2y &= 19 \\ & \underline{\hspace{2cm}} & 2y &= 19 - 15 \\ & & 2y &= 4 \\ & & y &= \frac{4}{2} \\ & & y &= 2 \end{aligned}$$

$$\text{Ex 2} \quad \begin{aligned} 3x - 4y &= 26 & (1) \\ 4x - 2y &= 18 & (2) \end{aligned}$$

$$(2) \times 2 \quad \begin{aligned} 8x - 4y &= 36 & (3) \end{aligned}$$

$$\begin{aligned} (3) - (1) \quad 5x &= 10 & \text{Sub for } x \text{ in (1)} \\ x &= \frac{10}{5} & 3(2) - 4y &= 26 \\ x &= 2 & 6 - 4y &= 26 \\ & \underline{\hspace{2cm}} & -4y &= 26 - 6 \\ & & -4y &= 20 \end{aligned}$$

$$\left\{ \begin{array}{l} x = 2 \\ y = -5 \end{array} \right.$$

$$y = \frac{20}{-4} = -5$$

E_x3

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

$$2x + 5y = 13 \quad (2)$$

$$(1) \times 5 \quad 20x - 15y = 0 \quad (3)$$

$$(2) \times 3 \quad 6x + 15y = 39 \quad (4)$$

$$(3) + (4) \quad 26x = 39$$

$$x = \frac{39}{26} = \frac{3}{2}$$

$$\text{Sub for } x \text{ in (2)} \quad 2\left(\frac{3}{2}\right) + 5y = 13$$

$$3 + 5y = 13$$

$$5y = 13 - 3$$

$$5y = 10$$

$$y = \frac{10}{5}$$

$$y = 2$$

$$\begin{cases} x = \frac{3}{2} \\ y = 2 \end{cases}$$