

## 7.1 Developing Systems

\* A linear system consists of **2 linear equations** that contain the same two variables

ex. Felix purchases 3 adult tickets and 2 student tickets for a concert. He pays \$41. Joanne pays \$16 for one adult ticket and one student ticket. Write a system of equations to represent this situation.

let  $a$  = cost of adult tickets    let  $d$  = cost of student tickets

$$\left. \begin{array}{l} \text{Joanne: } a + d = 16 \text{ ①} \\ \text{Felix: } 3a + 2d = 41 \end{array} \right\} \text{system of equations}$$

If  $a = 9$  and  $d = 7$ , verify the system

$$\text{① } a + d = 16$$

$$9 + 7 = 16$$

$$16 = 16$$

satisfies equ<sup>n</sup> ①

$\therefore$  adult tickets cost 9\$ and students = 7\$

$$\text{② } 3a + 2d = 41$$

$$3(9) + 2(7) = 41$$

$$27 + 14 = 41$$

$$41 = 41$$

satisfies equ<sup>n</sup> ②

ex. For the system below, which is the correct solution?

$$\text{① } c = 2d + 2$$

$$\text{② } c + 2d = -6$$

or

$$\text{Solution A: } c = 4 \text{ \& } d = 1$$

$$\text{Solution B: } c = -2 \text{ \& } d = -2$$

test sol<sup>n</sup> A:  $\begin{matrix} c = 4 \\ d = 1 \end{matrix}$

$$\text{① } 4 = 2(1) + 2$$

$$4 = 2 + 2 \checkmark$$

$$\text{② } 4 + 2(1) = -6$$

$$4 + 2 \neq -6$$

$\therefore$  sol<sup>n</sup> A is incorrect

test sol<sup>n</sup> B:  $\begin{matrix} c = -2 \\ d = -2 \end{matrix}$

$$\text{① } -2 = 2(-2) + 2$$

$$-2 = -4 + 2$$

$$-2 = -2 \checkmark$$

$$\text{② } -2 + 2(-2) = -6$$

$$-2 - 4 = -6 \checkmark$$

$\therefore$  sol<sup>n</sup> B is correct