

Exponential equations

Example on p. 12.

$$3. \quad 5^{2x} - 4 \cdot 5^x - 5 = 0.$$

$$\text{Let } 5^x = k; \text{ then } \begin{cases} (5^x)^2 = k^2 \\ 5^{2x} = k^2 \end{cases}$$

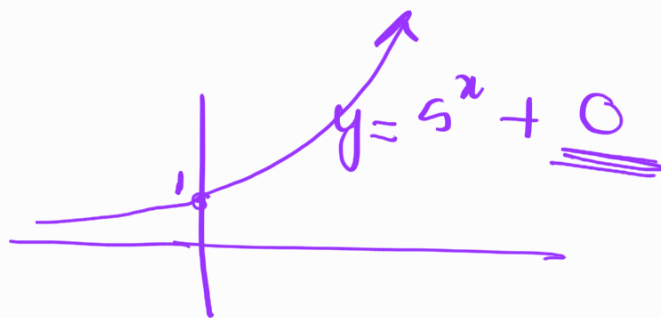
$$\therefore k^2 - 4k - 5 = 0.$$

$$(k-5)(k+1) = 0.$$

$$\therefore k = 5 \text{ or } k = -1.$$

$$\therefore 5^x = 5^1 \text{ or } \textcircled{5^x} = -1.$$

$$\therefore x = 1 \quad \text{N/A.}$$



$$2^{x+1} + 2^{3-x} = 17.$$

$$2^x \cdot 2^1 + 2^3 \cdot 2^{-x} = 17.$$

$$2^x \cdot 2 + \frac{8}{2^x} = 17.$$

$$\text{Let } 2^x = k.$$

$$2 \cdot k + \frac{8}{k} = 17$$

$$\text{LCM} = k.$$

$$2k \times k + \frac{8}{k} \times k = 17 \times k.$$

$$2k^2 + 8 = 17k.$$

$$2k^2 - 17k + 8 = 0.$$

$$2 \times 8 = 16$$

$$1 \times 16 = 16$$

$$1 \times 11 = 11$$

$$(2k - 1)(k - 8) = 0$$

$$\frac{-1 - 16}{-1} = -17.$$

$$\therefore k = \frac{1}{2} \quad \text{or} \quad k = 8.$$

$$\therefore 2^x = \frac{1}{8} \quad \text{or} \quad 2^x = 8$$

$$2^x = 2^{-3}$$

$$2^x = 2^3$$

$$\therefore x = -3$$

$$\therefore x = 3.$$

HW: p. 13

EX 2 (8, 9, 10, 11).

