Sec. 1.8 An Introduction to Equations

Vocabulary

- equation: mathematical sentence which says two expressions are equal (=)
- open sentence: equation containing one or more variable(s) which may be true or false depending on the value(s) of its variable(s)
- solution: value(s) of the variable(s) that makes the equation true

Problem 1: Is the equation true, false, or open?

a. $17 + 9 = 19 + 6$ False

$26 = 25$

b. $4 \times 11 = 44$ True

$44 = 44$

c. $3x - 1 = 17$ Open

Problem 2: Is the given number a solution for the equation?

a. $16 = 4x - 4;\ 5 = x$

$16 = 4(5) - 4$

$16 = 20 - 4$

$16 = 16$ True

5 is a solution

b. $6m - 8 = -5;\ \frac{1}{2}$

$6(\frac{1}{2}) - 8 = -5$

$3 - 8 = -5$

$-5 = -5$ True

$\frac{1}{2}$ is a solution

c. $\frac{3}{2}t + 2 = 4;\ \frac{2}{3}$

$\frac{3^1}{2} \cdot \frac{2^1}{3} + 2 = 4$

$1 + 2 = 4$

$3 = 4$ False

$\frac{3}{2} \cdot \frac{2}{3} = \frac{6}{6} = 1$

Problem 3:

An art student wants to make a model of a classroom. The length of the classroom is 2.4 times its width. The length of the student's model is 42 inches. What should the width of the model be?

$\ell = 2.4w$

$42 = 2.4w$

$42 = 2.4(17.5)$ T

$42 = 42$

$42 = 2.4(20.5)$ F

$42 = 49.2$

A. 17.5 in

B. 20.5 in

C. 82.6 in

D. 100.8 in

Problem 4: Use mental math to find the solution.

a. $x + 7 = 13$

$x = 6$

$6 + 7 = 13$ ✓

b. $\frac{x}{6} = 12$

$x = 72$

$\frac{72}{6} = 12$

$6\overline{)72}$ → 12, 6, 12, 12, 0

c. $12 - y = 3$

$y = 9$

$12 - 9 = 3$

$3 = 3$ ✓

d. $2 - x = -5$

$x = 7$

$2 - 7 = -5$

$-5 = -5$

Problem 5: Use a table to find the solution.

a. $3n+5=26$

n	$3n+5$	26?
8	$3(8)+5$ $24+5$	29 x ↓
7	$3(7)+5$ $21+5$	26 ✓

$n=7$

b. $25-3p=55$

p	$25-3p$	55
20	$25-3(20)$ $25-60$	-35
0	$25-3(0)$	25
-5	$25-3(-5)$ $25+15$	40
-10	$25-3(-10)$ $25+30$	55

$p=-10$

Problem 6: What is an estimate of the solution? Use a table.

a. $-6x + 4 = 21$

x	$-6x+4$	21
5	$-6(5)+4$ $-30+4$	-26
-3	$-6(-3)+4$ $18+4$	22
-2	$-6(-2)+4$ $12+4$	16

22 > 21 > 16

between -3 and -2