

Solving Linear Equations

Sections 2.1, 2.2, 2.3

Definitions

a) equation

b) expression

c) solution

Problem 1

Determine whether 2 is a solution of the equation. Please be neat, clear and *SHOW* your work.

a) $5(2x - 1) = 0$

b) $3(5 - x) = 3(2x - 1)$

Problem 2

Solve the following linear equations and **CHECK** your solution.

a) $-3(x + 1) = 18$

b) $-(4x + 10) = 6(x + 2)$

c) $\frac{1}{8}x + 3 = \frac{1}{4}x + 5$

$$\mathbf{d)} \quad 0.42x - 0.4(x + 2.4) = 0.3(5)$$

$$\mathbf{e)} \quad 7 = 3(x + 2) - 3(x - 5)$$

$$\mathbf{f)} \quad 4(x - 2) = 2(2x - 4)$$

$$\mathbf{g)} \quad \frac{4m - 5}{2} - \frac{3m + 1}{3} = \frac{5}{6}$$

Problem 3

Solve the following equation. Please be neat, clear and *SHOW* your work!!

1. $1 - 3(5b - 2) = 4 - (7b + 3)$

2. $\frac{5}{6}k = \frac{3}{4}k + \frac{1}{2}$

3. $\frac{5}{4} + \frac{9}{2}x = \frac{3}{8}x - \frac{1}{4}$

4. $\frac{3x+2}{2} = \frac{6x-3}{5}$

5. $\frac{2p+4}{3} - \frac{5p-7}{6} = \frac{11}{12}$

6. $0.4x - 1.6(2.5 - x) = 3.1(x - 5.4) - 11.3$

Problem 4

The following problems were taken from *Elementary Algebra* by Jay Lehmann

Two students try to solve the equation $2 = \frac{x}{2} + \frac{x}{3}$

Did either student, both students, or neither student solve the equation correctly? Explain.

Student A

$$\begin{aligned}2 &= \frac{x}{2} + \frac{x}{3} \\6 \cdot 2 &= 6\left(\frac{x}{2} + \frac{x}{3}\right) \\12 &= 6 \cdot \frac{x}{2} + 6 \cdot \frac{x}{3} \\12 &= 3x + 2x \\12 &= 5x \\ \frac{12}{5} &= x\end{aligned}$$

Student B

$$\begin{aligned}2 &= \frac{x}{2} + \frac{x}{3} \\&= \frac{x}{2} + \frac{x}{3} - 2 \\&= \frac{x}{2} \cdot \frac{3}{3} + \frac{x}{3} \cdot \frac{2}{2} - 2 \\&= \frac{3x}{6} + \frac{2x}{6} - 2 \\&= \frac{3x + 2x}{6} - 2 \\&= \frac{5x}{6} - 2\end{aligned}$$

Problem 5

The following problems were taken from *Elementary Algebra* by Jay Lehmann

Three students try to simplify the expression $\frac{x}{2} + \frac{x}{3}$

Which students, if any, simplified the expression correctly? Explain

Student C

$$\begin{aligned}\frac{x}{2} + \frac{x}{3} &= 6\left(\frac{x}{2} + \frac{x}{3}\right) \\&= 6 \cdot \frac{x}{2} + 6 \cdot \frac{x}{3} \\&= 3x + 2x \\&= 5x\end{aligned}$$

Student D

$$\begin{aligned}\frac{x}{2} + \frac{x}{3} &= \frac{3}{3} \cdot \frac{x}{2} + \frac{2}{2} \cdot \frac{x}{3} \\&= \frac{3x}{6} + \frac{2x}{6} \\&= \frac{3x + 2x}{6} \\&= \frac{5x}{6}\end{aligned}$$

Student E

$$\begin{aligned}\frac{x}{2} + \frac{x}{3} &= 0 \\6\left(\frac{x}{2} + \frac{x}{3}\right) &= 6 \cdot 0 \\6 \cdot \frac{x}{2} + 6 \cdot \frac{x}{3} &= 0 \\3x + 2x &= 0 \\5x &= 0 \\x &= 0\end{aligned}$$