Module 7 Lesson 6
TT 5. Possible Solutions

a. *Foundations and Pre-calculus Mathematics 10* (Pearson), question 13 on page 453

13. a) The student's diagram should look like the following.

Figure 1

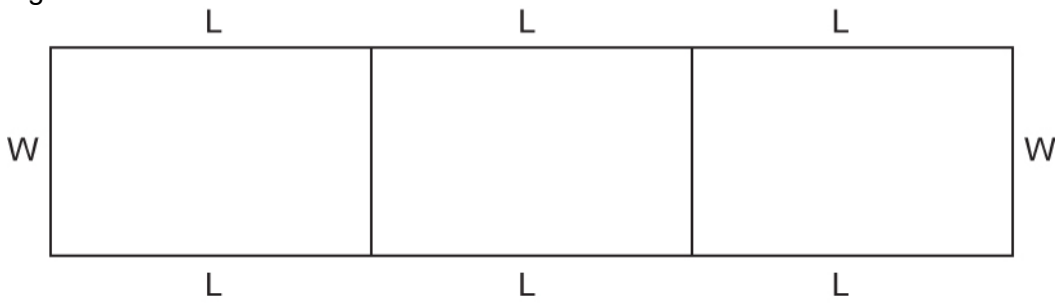
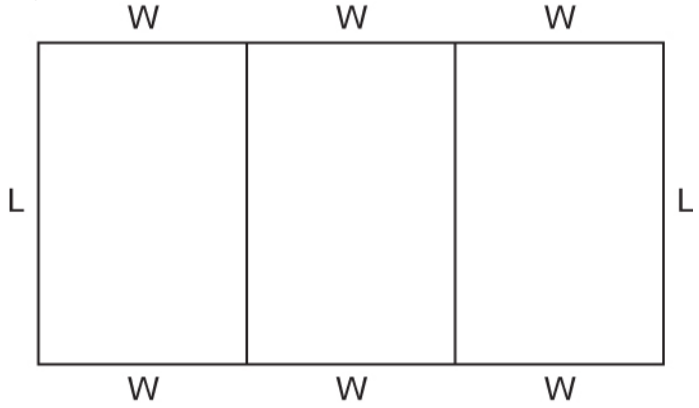


Figure 2



b) For 30 tables, either of the following is correct:

$30L + 30L + 2W = 306$

$30W + 30W + 2L = 190$

OR

$60L + 2W = 306$

$2L + 60W = 190$

c) You can solve this system by elimination. Multiply the first equation by 30.

$30(60L + 2W = 306) \rightarrow 1800L + 60W = 9180$

$2L + 60W = 190 \rightarrow 2L + 60W = 1090$

Subtract the equations to eliminate W.

$$\begin{array}{rl} & 1800L + 60W = 9180 \\ -\ (& 2L + 60W = 190) \\ \hline & 1798L = 8990 \end{array}$$

$$\frac{1798L}{1798} = \frac{8990}{1798}$$

$$L = 5$$

Solve for W.

$$\begin{aligned} 60L + 2W &= 306 \\ 60(5) + 2W &= 306 \\ 300 + 2W &= 306 \\ 2W &= 6 \\ \frac{2W}{2} &= \frac{6}{2} \\ W &= 3 \end{aligned}$$

The dimensions of each table are 5 m by 3 m.

b. *Foundations and Pre-calculus Mathematics 10* (Pearson), questions 5.a) and 6 on page 455

5. a)i) Solve by substitution.

$$x + 2y = 3$$
$$x = 3 - 2y$$

Substitute the expression for x into the first equation.

$$\begin{aligned} -3x - 4y &= -2 \\ -3(3 - 2y) - 4y &= -2 \\ -9 + 6y - 4y &= -2 \\ -9 + 2y &= -2 \\ 2y &= 7 \\ \frac{2y}{2} &= \frac{7}{2} \\ y &= 3.5 \end{aligned}$$

Solve for x.

$$\begin{aligned} x + 2y &= 3 \\ x + 2(3.5) &= 3 \\ x + 7 &= 3 \\ x &= -4 \end{aligned}$$

ii) Solve by elimination. Multiply the first equation by 3.

$$3(-0.5x + 0.2y = -1) \quad \text{Æ} \quad -1.5x + 0.6y = -3$$
$$0.3x - 0.6y = -1.8 \quad \text{Æ} \quad 0.3x - 0.6y = -1.8$$

Add the equation to eliminate y.

$$\begin{array}{r} -1.5x + 0.6y = -3 \\ +\ (0.3x - 0.6y = -1.8) \\ \hline -1.2x \qquad\quad = -4.8 \end{array}$$

$$\begin{aligned} \frac{-1.2x}{-1.2} &= \frac{-4.8}{-1.2} \\ x &= 4 \end{aligned}$$

Solve for y.

$$0.3x - 0.6y = -1.8$$
$$0.3(4) - 0.6y = -1.8$$
$$1.2 - 0.6y = -1.8$$
$$-0.6y = -3$$
$$\frac{-0.6y}{-0.6} = \frac{-3}{-0.6}$$
$$y = 5$$

iii) Isolate *x* in the first equation; then substitute the expression for *x* into the second equation.

$$x - \frac{1}{3}y = \frac{4}{3}$$
$$x = \frac{1}{3}y + \frac{4}{3}$$

Solve for *y* and then for *x*.

$$\frac{5}{6}x + \frac{1}{2}y = \frac{3}{2}$$
$$\frac{5}{6}\left(\frac{1}{3}y + \frac{4}{3}\right) + \frac{1}{2}y = \frac{3}{2}$$
$$\frac{5}{18}y + \frac{20}{18} + \frac{1}{2}y = \frac{3}{2}$$

$$\frac{5}{18}y + \frac{9}{18}y = \frac{27}{18} - \frac{20}{18} \quad \times 18$$

$$18\left(\frac{5}{18}y\right) + 18\left(\frac{9}{18}y\right) = 18\left(\frac{27}{18}\right) - 18\left(\frac{20}{18}\right)$$
$$5y + 9y = 27 - 20$$
$$14y = 7$$
$$\frac{14y}{14} = \frac{7}{14}$$
$$y = \frac{1}{2}$$

Sub y in and solve for x

$$x - \frac{1}{3}y = \frac{4}{3}$$
$$x - \frac{1}{3}\left(\frac{1}{2}\right) = \frac{4}{3}$$
$$x - \frac{1}{6} = \frac{4}{3}$$
$$x = \frac{8}{6} + \frac{1}{6}$$
$$x = \frac{9}{6}$$
$$x = \frac{3}{2}$$

6. a) Let x = the number of yellow squares. Let y = the number of red right triangles.

$$x + y = 90$$
$$25x + 12.5y = 1500$$

b) Isolate x in the first equation; then use the substitution method.

$$x + y = 90$$
$$x = 90 - y$$

$$25x + 12.5y = 1500$$
$$25(90 - y) + 12.5y = 1500$$
$$2250 - 25y + 12.5y = 1500$$
$$-12.5y + 2250 = 1500$$
$$-12.5y = -750$$
$$\frac{-12.5y}{-12.5} = \frac{-750}{-12.5}$$
$$y = 60$$

Solve for x.

$$x + y = 90$$
$$x + 60 = 90$$
$$x = 30$$

There were 30 yellow squares and 60 red right triangles used.

c. *Foundations and Pre-calculus Mathematics 10* (Pearson), question 28 on page 461

28. Let a = the value (in marks) of part A. Let b = the value (in marks) of part B.

$$0.875a + 0.75b = 87$$
$$a + b = 108$$

Isolate a in the second equation; then use the substitution method.

$$a + b = 108$$
$$a = 108 - b$$

$$0.875a + 0.75b = 87$$
$$0.875(108 - b) + 0.75b = 87$$
$$94.5 - 0.875b + 0.75b = 87$$
$$-0.125b + 94.5 = 87$$
$$-0.125b = -7.5$$
$$\frac{-0.125b}{-0.125} = \frac{-7.5}{-0.125}$$
$$b = 60$$

Solve for b.

$$a + b = 108$$
$$a + 60 = 108$$
$$a = 48$$