MAC1105 **Day 5 Classwork: Solve Systems of Three Equations**

Name _____ Score _____

Solve the system of linear equations. If the equations are dependent, write your answer with z being arbitrary.

1) $\begin{cases} x + y + z = 7 \\ x - y + 2z = 7 \\ 5x + y + z = 11 \end{cases}$

$2x + 3z = 14$

$6x + 3z = 18$

$3z = 14 - 2x$

$6x + (14 - 2x) = 18$

$4x + 14 = 18$

$4x = 4$

$x = 1$

$3z = 14 - 2(1)$

$3z = 14 - 2$

$3z = 12$

$z = 4$

$x + y + z = 7$

$(1) + y + 4 = 7$

$y + 5 = 7$

$y = 2$

$(1, 2, 4)$

Solve the problem by using three variables.

2) A basketball fieldhouse seats 15,000. Courtside seats sell for \$10, endzone for \$6, and balcony for \$4. The total revenue from a sell-out is \$82,000. If half the courtside and balcony seats and all the endzone seats are sold, the total revenue is \$47,000. How many of each type are there (show your work)? (Answer: 3000 courtside; 2000 endzone; 10,000 balcony).

x z y

(a) $x + y + z = 15000$

(b) $10x + 4y + 6z = 82000$

$10\left(\frac{1}{2}\right)x + 4\left(\frac{1}{2}\right)y + 6z = 47000$

(c) $5x + 2y + 6z = 47000$

(b-c) $10x + 4y + 6z = 82000$

$-5x - 2y - 6z = -47000$

(d) $5x + 2y = 35000$

6a − d $6x + 6y + 6z = 90000$

$-5x - 2y - 6z = -47000$

$x + 4y = 43000$

(e) $x = 43000 - 4y$

d&e $5(43000 - 4y) + 2y = 35000$

$215000 - 20y + 2y = 35000$

$-18y = 180000$

balcon $\rightarrow y = 10000$

$x = 43000 - 4y$

$= 43000 - 4(10000)$

$= 43000 - 40000$

$x = 3000$ courtside

$x + y + z = 15000$

$3000 + 10000 + z = 15000$

$13000 + z = 15000$

$z = 2000$