

## MTH 65 – Practice Final – Version 2 - Solutions to the word problems

16. Let  $B$  be the number of Burger packages bought and  $T$  be the number of turkey packages bought. Then we get the system of equations:

$$\begin{cases} 8B + 4T = 188 \\ 7.5B + 5.5T = 178 \end{cases}$$

Solving the first equation for  $T$  gives us  $T = 47 - 2B$ . Substituting  $47 - 2B$  for  $T$  in the second equation gives us:

$$7.5B + 5.5(47 - 2B) = 178 \Rightarrow 7.5B + 258.5 - 11B = 178 \Rightarrow -3.5B = -80.5 \Rightarrow B = 23$$

Substituting 23 for  $B$  in  $T = 47 - 2B$  gives us  $T = 1$ .

So Buster bought 23 packages of beef burgers and 1 package of turkey burgers.

17. The volume of a box is "length times width times height" so the volume of the cubic box is:

$$(6 \text{ in})(6 \text{ in})(6 \text{ in}) = 196 \text{ in}^3.$$

If we let  $L$  and  $W$  represent the length and width, respectively, (measure in inches) of the non-cubic box we get the following system of equations.

$$\begin{cases} 6LW = 196 \\ L = 2W + 1 \end{cases}$$

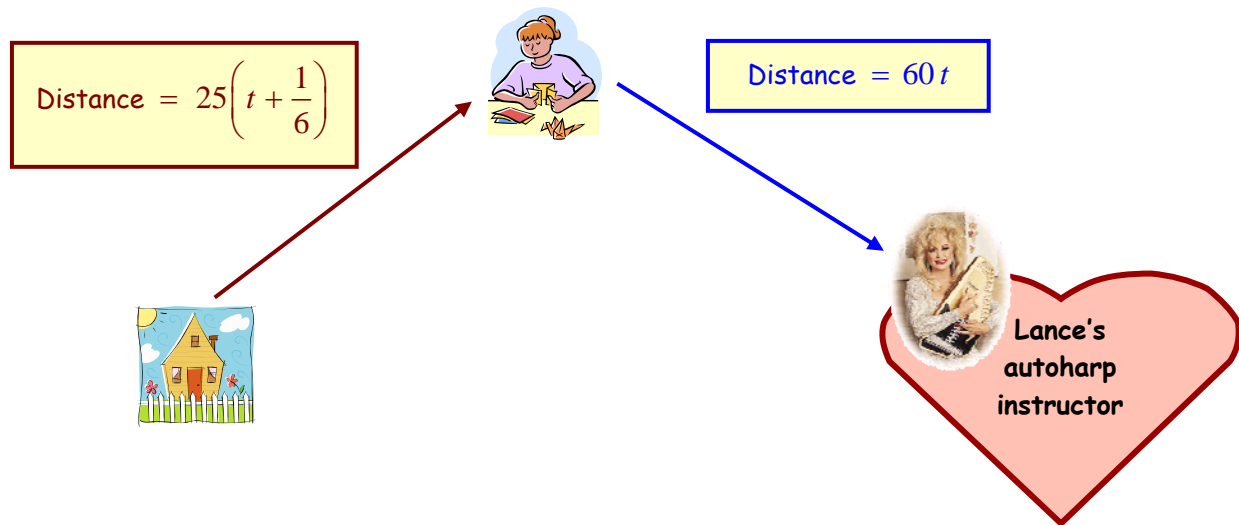
Substituting  $2W + 1$  for  $L$  in the first equation we get:

$$6(2W + 1)W = 196 \Rightarrow 12W^2 + 6W - 196 = 0 \Rightarrow 6(2W^2 + W - 36) = 0 \Rightarrow 6(2W + 9)(W - 4) = 0$$

So,  $W = -\frac{9}{2}$  or  $W = 4$ . Since lengths can't be negative, it must be the case that  $W = 4$  and  $L = 2(4) + 1 = 9$ .

So the length and width of the non-cubic box are 9 inches and 4 inches.

18. Let  $t$  be the time Vance spent driving from Chance to Lance (measured in hours). Then the time he spent driving from home to Chance was  $t + \frac{1}{6}$ . Using "distance equals rate times time" we get the diagram below.



Since the total distance driven was 32.5 miles, we get the equation:

$$25\left(t + \frac{1}{6}\right) + 60t = 32.5 \Rightarrow 25t + \frac{25}{6} + 60t = \frac{65}{2} \Rightarrow 85t = \frac{85}{3} \Rightarrow t = \frac{1}{3}$$

So Vance spent  $\frac{1}{3}$  hour (20 minutes) driving from Chance to Lance which means he spent 30 minutes driving from home to Chance.

Thus, Vance spent a total of 50 minutes driving on that trip.