

Lesson 2.4 Word Problems

- The Nathan's Hot Dog Eating Contest is a competition that takes place every year at New York's Coney Island on July 4th. The results of the 2015 Nathan's Hot Dog Eating Contest are shown below.

Hot Dog Eating Contest	
Winner	Hotdogs Eaten (Including Buns)
Matt Stonie (Men)	62
Miki Sudo (Women)	38
Contest Duration 10 minutes	

rate: Matt $\rightarrow \frac{62}{10} = 6.2$ per minute
 Miki $\rightarrow \frac{38}{10} = 3.8$ each minute

Suppose the men's and women's winners, Matt and Miki, decide to compete against each other. To make the competition more interesting, Matt will not start until Miki has eaten 20 hot dogs. Assume that Matt and Miki eat at a constant rate throughout the competition. Based on the number of hot dogs eaten in 10 minutes by Matt and Miki, how many minutes after Matt starts eating will they have eaten the same number of hot dogs?

$x = \text{minutes}$

$$\text{Matt} = \text{Miki}$$

$$6.2x = 3.8x + 20$$

$$\begin{array}{r} -3.8x \\ \hline 2.4x = 20 \end{array}$$

$$\begin{array}{r} 2.4x = 20 \\ \hline 2.4 \quad 2.4 \\ \hline x = 8.\bar{3} \text{ minutes} \end{array}$$

$x = 8.\bar{3}$ minutes

- Marley and Bennett are training to run a marathon. In the first week of training, Marley runs 11 miles, and Bennett runs 14 miles. Each week, Marley increases her weekly total by 2 miles, and Bennett increases his weekly total by 1.5 miles. Write and solve an equation to find how many weeks after the first week of training Marley and Bennett will be running the same number of miles.

x : weeks

$$\text{Marley} = \text{Bennett}$$

$$11 + 2x = 14 + 1.5x$$

$$\begin{array}{r} -1.5x \\ \hline 11 + 0.5x = 14 \end{array}$$

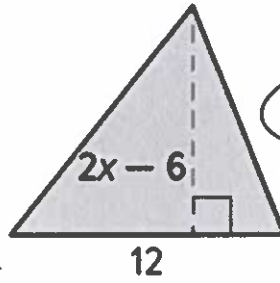
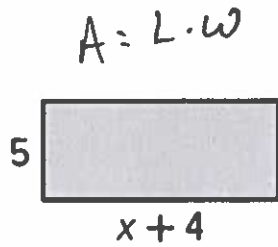
$$\begin{array}{r} 11 + 0.5x = 14 \\ -11 \quad -11 \\ \hline 0.5x = 3 \end{array}$$

$$\begin{array}{r} 0.5x = 3 \\ \hline 0.5 \quad 0.5 \\ \hline x = 6 \text{ weeks} \end{array}$$

$x = 6$ weeks

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3. Find the value of x so that the figures have the same area.



$A = \frac{1}{2} b \cdot h$

$A = \frac{1}{2} L \cdot w$

$\frac{1}{2} \cdot 12 \cdot (2x-6)$
 $6(2x-6)$
 $12x-36$

$12(2x-6)$
 $\frac{1}{2} \cdot 24x - 72$
 $12x - 36$

$2 \cdot 5(x+4) = \frac{12(2x-6)}{2}$

$10(x+4) = 12(2x-6)$

$10x+40 = 24x-72$
 $+72$ $+72$

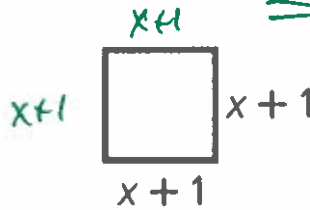
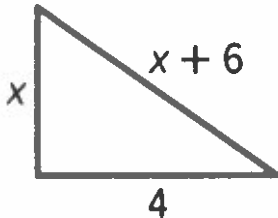
$5(x+4) = 12x-36$

$5(x+4) = 12x-36$

$10x+112 = 24x$
 $-10x$ $-10x$
 $112 = 14x$
 $\frac{112}{14} = \frac{14x}{14}$

$x=8$

4. Find the value of x so that the figures have the same perimeter.



Add all sides

$P = 2x + 10$

$P = 4x + 4$

$2x+10 = 4x+4$

$2x$ $2x$

$10 = 2x+4$
 -4 -4

$6 = 2x$

$x=3$