Homework: Section 6.1 on Pg. 207; #9-17all

Warm-up Solve the following equations then check your answers:

a) $5x + 2 = 2x + 11$

$-2x \quad -2x$

$\Rightarrow 5x - 2x + 2 = 2x - 2x + 11$

$3x + 2 = 11$

$-2 \quad -2$

$\frac{3x}{3} = \frac{9}{3} \Rightarrow x = 3$

Check

$5(3) + 2 = 17$

$2(3) + 11 = 17$ ✓

b) $\frac{6}{5}x - 3 = -5$

$+3 \quad +3$

$\frac{6}{5}x = -2 \cdot 5$

$\frac{6x}{6} = \frac{-10}{6} \Rightarrow x = -\frac{10}{6} = -\frac{5}{3}$

Check $\frac{6}{5} \cdot \left(-\frac{5}{3}\right) - 3$

$= -2 - 3$

$= -5$ ✓

c) $\frac{2}{5x} = -4$

$5x \cdot \quad 5x$

$2 = -20x$

$\frac{2}{-20} = \frac{-20x}{-20}$

$-\frac{1}{10} = x$

Check:

$\frac{2}{5\left(-\frac{1}{10}\right)} = \frac{2}{-\frac{5}{10}}$

$= 2 \div \frac{-5}{10} = 2 \cdot \frac{-10}{5}$

$= \frac{-20}{5} = -4$ ✓

d) $\frac{3x}{2} = \frac{5x}{6} + 1$

$\left(\frac{3x}{2} - \frac{5x}{6} = 1\right) \cdot 6$

$9x - 5x = 6$

$4x = 6$

$x = \frac{6}{4} = \frac{3}{2}$

$\frac{3x \cdot 3}{2 \cdot 3} - \frac{5x}{6} = 1$

$\frac{9x}{6} - \frac{5x}{6} = 1$

$\frac{9x - 5x}{6} = 1$

$6 \cdot \frac{4x}{6} = 1 \cdot 6$

$4x = 6$

$x = \frac{6}{4} = \frac{3}{2}$

Word Problem Vocabulary

When we solve word problems, the most important (and difficult) step is to turn the word problem into an equation. Below are common phrases and what they look like as equations.

The sum of a number and 4 $x + 4$	Eight times a number $8x$
Six more than a number $x + 6$	Fifteen percent of a number $0.15x$
Two added to a number $2 + x$	Double a number $2x$
A number increased by ten $x + 10$	The product of a number and four $4x$
Seven less than a number $x - 7$	Half a number $x/2$
Nine minus a number $9 - x$	The quotient of a number and six (top / bottom) $\frac{x}{6}$
A number decreased by 5 $x - 5$	The quotient of five and a number (top / bottom) $5/x$

Tips for solving word problems

1. Highlight the parts of the question with important information (like the phrases on the last page)
2. Define a variable (something you don't know but you want to solve for)
3. Setup an equation you can solve, then solve it ← linear
4. Relate your answer for x back to what the question is asking for. Check it if you can!

Ex 1 The sum of 3 consecutive odd numbers is 51. Find the numbers.

in-a-row next to eachother

Ans: 15, 17, 19

x = 1st number

$2^{nd} = x + 2$

$3^{rd} = x + 4$

$\Rightarrow x + (x+2) + (x+4) = 51$

$3x + 6 = 51$

$3x = 45 \Rightarrow x = 15$

Ex 2 A father has a has a son that is one-third his age plus 2. If you subtract their ages, you get 28. How old is each person?

x = father's age

Son's age $= \frac{x}{3} + 2$

Dad's − Son's

$\Rightarrow x - \left(\frac{x}{3} + 2\right) = 28$

$\left(x - \frac{x}{3} - 2 = 28\right) \cdot 3$

$3x - x - 6 = 84 \Rightarrow 2x - 6 = 84 \Rightarrow 2x = 90$

$x = 45$

Ans:

Dad	Son
45	17

Son: $\frac{45}{3} + 2 = 15 + 2 = 17$

Ex 3 A 87 cm piece of wood is cut into 3 pieces. The second piece is 60% of the length of the first piece. The third piece is twice the length of the first piece minus 3. What is the length of each piece?

x = 1st piece

$2^{nd} = 0.6x$

$3^{rd} = (2x - 3)$

$\Rightarrow 87 = x + 0.6x + (2x - 3) \Rightarrow 90 = 3.6x$

$87 \overset{+3}{=} x + \frac{6}{10}x + 2x - 3 \overset{+3}{}$

$\frac{90}{3.6} = x$

$x = 25$

$\left(90 = 3x + \frac{6}{10}x\right) \cdot 10$

$900 = 30x + 6x$

$900 = 36x$

$\frac{900}{36} = x = 25$

Ans:

1st	2nd	3rd
25	+ 15	+ 47 = 87 ✓

$2^{nd} = 25 \cdot 0.6 = 15$

$3^{rd} = 25 \cdot 2 - 3 = 47$