Math 9 – Unit 4: Word Problems

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Lesson #3: Solving Word Problems

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To solve a word problem, carefully read the question, create the "LET" statements, create the equation, solve the equation, then finally ANSWER THE QUESTION!

a) The Mackenzie River is 1183 km longer than the St. Lawrence River. The sum of their lengths is 7299 km. How long is each river?

Let: Mackenzie: $x + 1183$

St. Lawrence: x

Equation: $(x) + (x + 1183) = 7299$

$2x + 1183 = 7299$ (−1183 −1183)

$\frac{2x}{2} = \frac{6116}{2}$

$x = 3058$

∴ The St. Law River is 3058 km and the Mac River is 4241 km long

b) The sum of two numbers is 46. One number is 12 more than the other number. What are the numbers?

Let: number 1: $x + 12$

number 2: x

Equation: $(x + 12) + (x) = 46$

$2x + 12 = 46$ (−12 −12)

$\frac{2x}{2} = \frac{34}{2}$

$x = 17$

∴ The numbers are 17 and 29.

c) The length of a rectangle is 5m more than its width. If the perimeter is 90m, what are the dimensions?

Let: length: $x + 5$

width: x

Eqn: $2(x + (x + 5)) = 90$ (w, l)

$2(2x + 5) = 90$

$4x + 10 = 90$ (−10 −10)

$\frac{4x}{4} = \frac{80}{4}$

$x = 20$

∴ the width is 20m and the length is 25m.

d) The sum of 3 consecutive numbers is 105. Find the numbers.

in a row

Let: number 1: x

number 2: $x + 1$

number 3: $x + 2$

Eqn: $(x) + (x + 1) + (x + 2) = 105$

$3x + 3 = 105$ (−3 −3)

$\frac{3x}{3} = \frac{102}{3}$

$x = 34$

∴ The three numbers are 34, 35, and 36.

e) The maximum life span of a brown bear is ten times the maximum life span of a mouse. The sum of their life spans is 33 years. What are the maximum life spans of each animal?

Let: Bear: $10x$
Mouse: x

Eqn: $(x) + (10x) = 33$

$11x = 33$

$\frac{11x}{11} = \frac{33}{11}$

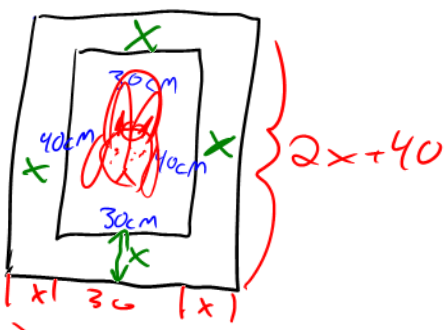
$x = 3$

∴ the mouse's life span is 3 years and the bear's life span is 30 years

f) A picture measures 40 cm by 30 cm. The outside perimeter of the frame around the picture is 156 cm. What is the width of the frame?

or border

Let: x



Eqn: $2\left(\underbrace{(2x+30)}_{\text{width}} + \underbrace{(2x+40)}_{\text{length}}\right) = 156$

$2(4x + 70) = 156$

$8x + 140 = 156$ (−140)

$8x = 16$

$\frac{8x}{8} = \frac{16}{8}$

$x = 2$

∴ the width of the border is 2 cm.

add

g) Together, Mary and Luke are 46 years old. If Luke is two years younger than 3 times Mary's age, how old are they?

Let: Luke: $3x - 2$
Mary: x

Eqn: $(x) + (3x - 2) = 46$

$4x - 2 = 46$ (+2)

$\frac{4x}{4} = \frac{48}{4}$

$x = 12$

∴ Mary is 12 years old and Luke is 34.

h) There are 23 animals in the field. Some are pigs and some are chickens. There are 76 legs in all. How many of each animal are in the field?

Let: pigs: x → 4 legs
chickens: $23 - x$ → 2 legs

eqn: $4(\underbrace{x}_{\text{pigs}}) + 2(\underbrace{23-x}_{\text{chickens}}) = 76$

$4x + 46 - 2x = 76$ (−46)

$2x = 30$

$\frac{2x}{2} = \frac{30}{2}$

$x = 15$

∴ There are 15 pig and 8 chickens.