

Ch.7 Word Problems

1. The sum of 2 numbers is 58 and their difference is 6. Determine the numbers.

x : first #
 y : 2nd #

$$\begin{array}{r}
 x + y = 58 \\
 -(x - y = 6) \\
 \hline
 2y = 52 \\
 \div 2 \quad \div 2 \\
 \hline
 y = 26 \\
 x + 26 = 58 \\
 \hline
 x = 32
 \end{array}$$

2. The combined length of one eraser and one pencil is 21 cm. The length of 4 easers connected together is 24 cm longer than one pencil. What is the length of a pencil and an eraser?

x : length of eraser
 y : length of pencil.

$$\begin{array}{l}
 x + y = 21 \\
 4x = y + 24 \\
 \hookrightarrow 4x - 24 = y \\
 x + 4x - 24 = 21 \\
 5x - 24 = 21 \\
 5x = 45 \\
 x = 9 \text{ cm} \\
 9 + y = 21 \\
 y = 12 \text{ cm}
 \end{array}$$

3. The larger number is four less than three times the smaller number. If the sum of three times the larger number and four times the smaller number is 261, then what are the numbers?

x : larger #
 y : smaller #

$$\begin{array}{l}
 x = 3y - 4 \\
 3x + 4y = 261 \\
 3(3y - 4) + 4y = 261 \\
 9y - 12 + 4y = 261 \\
 13y - 12 = 261 \\
 13y = 273 \\
 y = 21 \\
 x = 3(21) - 4 \\
 = 63 - 4 \\
 x = 59
 \end{array}$$

4. A math textbook has a total of 1382 pages which is broken into two parts. The second part of the book has 64 more pages than the first part. How many pages are in each part of the book?

x : # of pages in part 1
 y : " " 2

$$\begin{array}{l}
 x + y = 1382 \\
 x + 64 = y \\
 x + (x + 64) = 1382 \\
 2x + 64 = 1382 \\
 2x = 1318 \\
 x = 659 \text{ pages} \\
 y = (659) + 64 \\
 = 723 \text{ pages}
 \end{array}$$

5. Last season two running backs on the BC Lions rushed for a combined total of 1500 yards. If one rushed 45 more than twice the number of yards as the other, then how many yards did each player rush for?

x : # of yards for player 1
 y : " " 2

$$\begin{aligned}
 x + y &= 1500 \\
 x &= 2y + 45 \\
 (2y + 45) + y &= 1500 \\
 3y + 45 &= 1500 \\
 3y &= 1455
 \end{aligned}$$

$y = 485$ yds
 $x + 485 = 1500$
 $x = 1015$ yds

6. Dennis has a coin collection made up of dimes and nickels. He has 80 coins in total worth at \$6.60. How many of each type of coins did he collect?

x : # of dimes
 y : # of nickels

$$\begin{aligned}
 x + y &= 80 \\
 (0.1x + 0.05y = 6.6) \times 10 \\
 x + 0.5y &= 66
 \end{aligned}$$

$$0.5y = 14$$

$y = 28$ nickels
 $x + 28 = 80$
 $x = 52$ dimes

7. On Monday Mr. H bought 7 cups of coffee and 12 muffins for the math department at a cost of \$42.95. It turns out that the muffins were a hit with the department, so on Tuesday, Ms. Young went to the same place and bought 5 cups of coffee and 24 muffins for a total of \$47.65. How much did each item cost?

x : cost for 1 cup of coffee
 y : cost for 1 muffin.

$$\begin{aligned}
 (7x + 12y = 42.95) \times 2 \\
 5x + 24y &= 47.65 \\
 -14x + 24y &= 85.90 \\
 \hline
 -9x &= -38.25 \\
 x &= \$4.25
 \end{aligned}$$

$5(4.25) + 24y = 47.65$
 $21.25 + 24y = 47.65$
 $24y = 26.4$
 $y = \$1.1$

8. How many litres of 20% alcohol solution and 50% alcohol solution must be mixed to get 9 litres of 30% alcohol solution?

x : amount of 20% alcohol
 y : " 50% "

$$\begin{aligned}
 (x + y = 9) \times 0.2 \\
 0.2x + 0.5y &= 0.3 \times 9 \\
 -0.2x + 0.2y &= 1.8 \\
 \hline
 0.3y &= 0.9 \\
 y &= 3 \text{ l}
 \end{aligned}$$

$x + 3 = 9$
 $x = 6$