Review of Word Problems

For each problem, include a complete solution. Remember to include let and therefore statements.

1. Suppose that two sides of a triangle are equal, and the third side is 10cm greater than each of the other two. The perimeter of the triangle is 100cm. Find the length of each side.

   \[ \text{let } x \text{ represent the smaller side} \]
   \[ x + x + (x+10) = 100 \]
   \[ 3x + 10 = 100 \]
   \[ 3x = 90 \]
   \[ x = 30 \]

2. The perimeter of a rectangle is 156cm. The length is twice as long as the width. Find the length and the width.

   \[ \text{let } x \text{ represent the width} \]
   \[ 2x \text{ represent the length} \]
   \[ 2(2x) + 2x = 156 \]
   \[ 4x + 2x = 156 \]
   \[ 6x = 156 \]
   \[ x = 26 \]
   \[ \therefore \text{the length is 52cm and the width is 26cm.} \]

3. Find four consecutive odd numbers whose sum is 240.

   \[ \text{let the numbers be} \]
   \[ x, x+2, x+4, x+6 \]
   \[ x + (x+2) + (x+4) + (x+6) = 240 \]
   \[ 4x + 12 = 240 \]
   \[ 4x = 228 \]
   \[ x = 57 \]
   \[ \therefore \text{the numbers are 57, 59, 61, 63} \]

4. Wanda has seven more dimes than nickels. The total value of coins is $6.55. How many nickels does she have?

   \[ \begin{array}{c|c}
   \text{# of coins} & \text{value in cents} \\
   \hline
   \text{nickels} & 0.05(x) \\
   \text{dimes} & 0.10(x+7) \\
   \text{total} & 6.55 \\
   \end{array} \]
   \[ 0.05(x) + 0.10(x+7) = 6.55 \]
   \[ 0.05x + 0.10x + 0.7 = 6.55 \]
   \[ 0.15x = 5.85 \]
   \[ x = 39 \]

5. A collection of 33 coins, consisting of nickels, dimes, and quarters, has a value of $3.30. If there are three times as many nickels as quarters, and one-half as many dimes as nickels, how many coins of each kind are there?

   \[ \begin{array}{c|c|c}
   \text{# of coins} & \text{value in cents} \\
   \hline
   \text{nickels} & 3x & 0.05(3x) \\
   \text{dimes} & \frac{3x}{2} & 0.10 \left( \frac{3x}{2} \right) \\
   \text{quarters} & x & 0.25(x) \\
   \text{total} & 33 & 3.30 \\
   \end{array} \]
   \[ 0.05(3x) + 0.10 \left( \frac{3x}{2} \right) + 0.25(x) = 3.30 \]
   \[ 0.15x + 0.15x + 0.25x = 3.30 \]
   \[ 0.55x = 3.30 \]
   \[ x = 6 \]

6. Allison is 29 years older than Nicole. Fifteen years from now, Allison will be twice as old as Nicole. How old are they today?

   \[ \begin{array}{c|c|c}
   \text{now} & \text{from now} \\
   \hline
   \text{Allison} & x+29 & (x+29) + 15 = x+44 \\
   \text{Nicole} & x & x+15 \\
   \end{array} \]
   \[ \text{let } x \text{ rep. Nicole's age in years} \]
   \[ \text{Allison's age} = 2 \times \text{Nicole's age} \]
   \[ x+44 = 2(x+15) \]
   \[ x+44 = 2x + 30 \]
   \[ 44-30 = 2x - x \]
   \[ x = 14 \]
   \[ \therefore \text{Allison's age is 15} \]
   \[ 14 + 29 = 43 \text{ yrs old} \]