Applications of Linear Equations Part II

Problems from Geometry

The sum of three angle measurements in a triangle is 180°.

Example 1: Solve for \( x \) given the triangle below. Then find each angle measurement.

Knowing that the sum of three angles in a triangle is 180°, we can set up an equation to solve for \( x \).

\[
x + (x+10) + (x+20) = 180
\]

\[
3x + 30 = 180
\]

\[
3x = 150
\]

\[
x = 50
\]

Since \( x = 50 \), the three angles are 50°, 60°, and 70°.
Two angles are said to be **complementary** if their sum is $90^\circ$.

Two angles are said to be **supplementary** if their sum is $180^\circ$.

**Example 2:** Find the measure of an angle whose complement is $30^\circ$ more than its measure.

Let's call the measure of the angle $x$. Then we can express its complement as $x + 30$.

Since the two angles are complementary, their sum must be $90^\circ$. Therefore, we get the following equation.

$$x + x + 30 = 90$$

Now we can solve for $x$:

$$x + x + 30 = 90$$

$$2x + 30 = 90$$

$$2x = 60$$

$$x = 30$$
Example 3: Find the measure of an angle whose supplement is four times its measure.

Let \( \_ \) represent the measure of the angle. Then \( \_ \) represents its supplement.

Since the two angles are supplementary, their sum must be \( \_ \)°.

Therefore we get the following equation:

\[ \_ + \_ = \_ \]

Now solve for \( x \):
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Practice Problems

1. Find each angle measurement for the triangle below:

```
\[ \begin{array}{c}
\angle 3x^\circ \\
\angle 2x^\circ \\
\angle x^\circ \\
\end{array} \]
```

2. Find the measure of an angle whose complement is twice its measure.

3. Find the measure of an angle whose supplement is 9 times its measure.