Solve Linear Equations Worksheets

For each of the following problems, write an equation and solve.

1. A triangle has angles described as follows: The measure of the first angle is four more than seven times a number, the measure of the second angle is four less than the first, and the measure of the third angle is twice as large as the first. What is the measure of each angle in degrees?

2. One angle measures nine more than six times a number. A sequence of rigid motions maps the angle onto another angle that is described as being thirty less than nine times the number. What is the measure of the angle in degrees?

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Let x be the number. The measure of the first angle is $7x + 4$. The measure of the second angle is $7x + 4 - 4 = 7x$. The measure of the third angle is $2(7x + 4) = 14x + 8$. The sum of the angles of a triangle must be $180°$.

$$7x + 4 + 7x + 14x + 8 = 180$$
$$28x + 12 = 180$$
$$28x + 12 - 12 = 180 - 12$$
$$28x = 168$$
$$x = 6$$

Replacing x with 6 in $7x + 4$ gives $7(6) + 4 = 42 + 4 = 46$. Replacing x with 6 in $7x$ gives $7(6) = 42$. Replacing x with 6 in $14x + 8$ gives $14(6) + 8 = 84 + 8 = 92$. Therefore, the measures of the angles are $46°$, $42°$, and $92°$.

2. One angle measures nine more than six times a number. A sequence of rigid motions maps the angle onto another angle that is described as being thirty less than nine times the number. What is the measure of the angle in degrees?

Let x be the number. Then, the measure of one angle is $6x + 9$. The measure of the other angle is $9x - 30$. Since rigid motions preserve the measures of angles, then the measure of these angles is equal.

$$6x + 9 = 9x - 30$$
$$6x + 9 - 9 = 9x - 30 - 9$$
$$6x = 9x - 39$$
$$6x - 9x = 9x - 9x - 39$$
$$-3x = -39$$
$$x = 13$$

Replacing x with 13 in $6x + 9$ gives $6(13) + 9 = 78 + 9 = 87$. Therefore, the angle measure is $87°$.

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