

Set up the unknowns

Set up the equation

Solve and answer the question

1. Two angles form a linear pair. One angle measures twenty less than four times the other angle. Find the degrees in both angles.

$$\begin{array}{l} 40^\circ \angle 1 \quad x \\ 140^\circ \angle 2 \quad 4x - 20 \end{array}$$

$$x + 4x - 20 = 180$$

$$5x - 20 = 180$$

$$5x = 200$$

$$x = 40$$

2. Two angles are complementary. One angle measures eighteen more than five times the other angle. Find the degrees in both angles.

$$\begin{array}{l} 12^\circ \angle 1 \quad x \\ 78^\circ \angle 2 \quad 5x + 18 \end{array}$$

$$x + 5x + 18 = 90$$

$$6x + 18 = 90$$

$$6x = 72$$

$$x = 12$$

3. The angles of a triangle are in the ratio of 1:2:7. Find the measures of the three angles.

$$\begin{array}{l} 18^\circ \angle 1 \quad x \\ 36^\circ \angle 2 \quad 2x \\ 126^\circ \angle 3 \quad 7x \end{array}$$

$$x + 2x + 7x = 180$$

$$10x = 180$$

$$x = 18$$

4. Two angles are supplementary. One angle measures seven times the other angle less four. Find the measures of the angles.

$$\begin{array}{l} 23^\circ \angle 1 \quad x \\ 157^\circ \angle 2 \quad 7x - 4 \end{array}$$

$$x + 7x - 4 = 180$$

$$8x - 4 = 180$$

$$8x = 184$$

$$x = 23$$

5. Find the measures of the three angles of triangle ABC if the measure of angle A is equal to the measure of angle B.

$$48^\circ \text{ measure of angle A} = 2(6x - 5y) + 4$$

$$48^\circ \text{ measure of angle B} = 54 - 3(2x - 3y)$$

$$84^\circ \text{ measure of angle C} = 4(5x - 6y) - 2(4y - 3x) + 30$$

$$m\angle A = m\angle B$$

$$2(6x - 5y) + 4 = 54 - 3(2x - 3y)$$

$$12x - 10y + 4 = 54 - 6x + 9y$$

$$18x - 19y = 50$$

$$\begin{array}{r} 33(18x - 19y = 50) \\ -19(32x - 33y = 92) \end{array}$$

$$594x - 627y = 1650$$

$$-608x + 627y = -1748$$

$$-14x = -98 \Rightarrow x = 7$$

$$m\angle A + m\angle B + m\angle C = 180^\circ$$

$$12x - 10y + 4 + 54 - 6x + 9y + 4(5x - 6y) - 2(4y - 3x) + 30 = 180$$

$$6x - y + 58 + 20x - 24y - 8y + 6x = 180$$

$$32x - 33y = 92$$

$$32(7) - 33y = 92$$

$$224 - 33y = 92$$

$$-33y = -132$$

$$y = 4$$

6. Angle ABC and angle MBT are vertical angles. Angle TBC and angle CBA form a linear pair. Find the measures of the three angles if:

$$62^\circ \text{ measure of angle ABC} = 2(5x - 3y) + 22$$

$$118^\circ \text{ measure of angle ABM} = -10 - 4(3x - 4y)$$

$$62^\circ \text{ measure of angle MBT} = 5x + 2(6y - 7x) - 34$$

$$m\angle ABC = m\angle MBT$$

$$2(5x - 3y) + 22 = 5x + 2(6y - 7x) - 34$$

$$10x - 6y + 22 = 5x + 12y - 14x - 34$$

$$19x - 18y = -56$$

$$2(19x - 18y = -56)$$

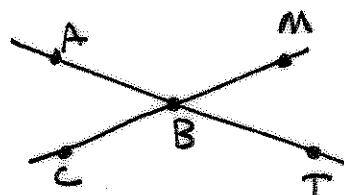
$$19(-2x + 10y = 168)$$

$$38x - 36y = -112$$

$$-38x + 190y = 3192$$

$$154y = 3080$$

$$y = 20$$



$$m\angle ABC + m\angle ABM = 180^\circ$$

$$2(5x - 3y) + 22 - 10 - 4(3x - 4y) = 180$$

$$10x - 6y + 22 - 10 - 12x + 16y = 180$$

$$-2x + 10y = 168$$

$$-2x + 10(20) = 168$$

$$-2x + 200 = 168$$

$$-2x = -32$$

$$x = 16$$