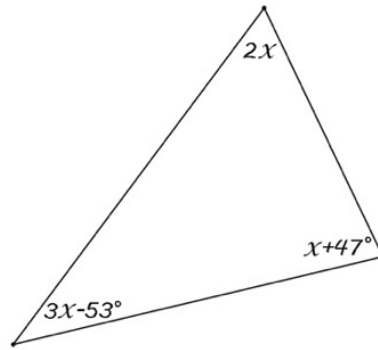


Sample Problems

1. Two angles in a triangle measure 39° and 58° . Compute the measure of the third angle in the triangle.
2. One angle in a triangle is 27° . The difference between the measures of the other two angles is 41° . Find the measure of the missing angles.
3. In triangle ABC, the measure of angle A is twice the measure of angle B . The measure of angle C is 40° more than the measure of angle B . Find the measure of the angles in the triangle.
4. Consider triangle ABC. The measure of angle B is ten degrees less than twice the measure of A . The measure of angle C is two degrees less than three times the measure of A . Find the measure of the angles in this triangle.
5. Consider the triangle shown on the picture below.

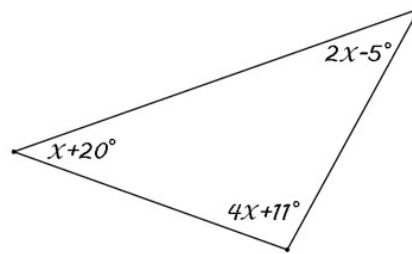


- a) Compute the value of x .
- b) Compute the measure of the angles in the triangle.

Practice Problems

1. Two angles in a triangle measure 43° and 70° . Compute the measure of the third angle in the triangle.
2. One angle in a triangle is 50° . The difference between the measures of the other two angles is 38° . Find the measure of the missing angles.
3. In triangle ABC, the measure of angle A is twice the measure of angle B . The measure of angle C is 12° more than the measure of angle B . Find the measure of the angles in the triangle.
4. Consider triangle ABC. The measure of angle B is one degree less than twice the measure of A . The measure of angle C is thirteen degrees more than three times the measure of A . Find the measure of the angles in this triangle.

5. Consider the triangle shown on the picture below.



- Compute the value of x .
- Compute the measure of the angles in the triangle.

Sample Problems - Answers

- 83°
- 56° and 97°
- $\angle A = 70^\circ$, $\angle B = 35^\circ$, $\angle C = 75^\circ$
- $\angle A = 32^\circ$, $\angle B = 54^\circ$, $\angle C = 94^\circ$
- a) 31° b) 62° , 40° , and 78°

Practice Problems - Answers

- 67°
- 46° and 84°
- $\angle A = 42^\circ$, $\angle B = 84^\circ$, $\angle C = 54^\circ$
- $\angle A = 28^\circ$, $\angle B = 55^\circ$, $\angle C = 97^\circ$
- a) 22° b) 42° , 39° , 99°

Sample Problems - Solutions

1. Two angles in a triangle measure 39° and 58° . Compute the measure of the third angle in the triangle.

Solution: Let us denote the missing angle by x . We know that the three angles add up to 180° .

$$\begin{aligned} 39^\circ + 58^\circ + x &= 180^\circ && \text{combine like terms} \\ 97^\circ + x &= 180^\circ && \text{subtract } 97^\circ \\ x &= 83^\circ \end{aligned}$$

So the missing angle measures 83° . We check:

$$39^\circ + 58^\circ + 83^\circ = 180^\circ$$

and so our solution is correct.

2. One angle in a triangle is 27° . The difference between the measures of the other two angles is 41° . Find the measure of the missing angles.

Solution: Let us denote the smaller unknown angle by x . Then the other unknown angle measures $x + 41^\circ$ because these two differ by 41° . The equation will express the sum of the three triangles.

angle 1: 27°

angle 2: x

angle 3: $x + 41^\circ$

$$\begin{aligned} 27^\circ + x + x + 41^\circ &= 180^\circ && \text{combine like terms} \\ 2x + 68^\circ &= 180^\circ && \text{subtract } 68^\circ \\ 2x &= 112^\circ && \text{divide by 2} \\ x &= 56^\circ \end{aligned}$$

Our result, $x = 56^\circ$ means that one unknown angle is 56° , and the other one is $x + 41^\circ = 56^\circ + 41^\circ = 97^\circ$. So the three angles are 27° , 56° and 97° . We check: the sum of the three angles is $27^\circ + 56^\circ + 97^\circ = 180^\circ$ and the difference between the angles we found is $97^\circ - 56^\circ = 41^\circ$. Thus our solution is correct.

3. In triangle ABC, the measure of angle A is twice the measure of angle B . The measure of angle C is 40° more than the measure of angle B . Find the measure of the angles in the triangle.

Solution: Notice that angles A and C are both compared to angle B . So, let us denote angle B by x . Then we can label the other angles in terms of x .

angle A : $2x$

angle B : x

angle C : $x + 40^\circ$

The equation will express the sum of the three angles

$$\begin{aligned} \angle A + \angle B + \angle C &= 180^\circ \\ 2x + x + x + 40^\circ &= 180^\circ && \text{combine like terms} \\ 4x + 40^\circ &= 180^\circ && \text{subtract } 40^\circ \\ 4x &= 140^\circ && \text{divide by 4} \\ x &= 35^\circ \end{aligned}$$

Now that we know the value of x , we can compute the measure of the angles:

$$\text{angle } A: 2x \implies 70^\circ$$

$$\text{angle } B: x \implies 35^\circ$$

$$\text{angle } C: x + 40^\circ \implies 75^\circ$$

So the three angles are: angle A is 70° , angle B is 35° , and angle C is 75° . We check: the sum of the three angles is $70^\circ + 35^\circ + 75^\circ = 180^\circ$. We also check the connection between the angles: angle A is indeed twice angle B : $70^\circ = 2 \cdot 35^\circ$ and angle C is indeed 40° greater than angle B : $75^\circ = 35^\circ + 40^\circ$.

4. Consider triangle ABC . The measure of angle B is ten degrees less than twice the measure of A . The measure of angle C is two degrees less than three times the measure of A . Find the measure of the angles in this triangle.

Solution: Let us denote the measure of angle A by x . Then we can label all three angles in terms of x .

$$\text{angle } A: x$$

$$\text{angle } B: 2x - 10^\circ$$

$$\text{angle } C: 3x - 2^\circ$$

$$\begin{aligned} \angle A + \angle B + \angle C &= 180^\circ \\ x + 2x - 10^\circ + 3x - 2^\circ &= 180^\circ && \text{combine like terms} \\ 6x - 12^\circ &= 180^\circ && \text{add } 12^\circ \\ 6x &= 192^\circ && \text{divide by } 6 \\ x &= 32^\circ \end{aligned}$$

$$\text{angle } A: x = 32^\circ$$

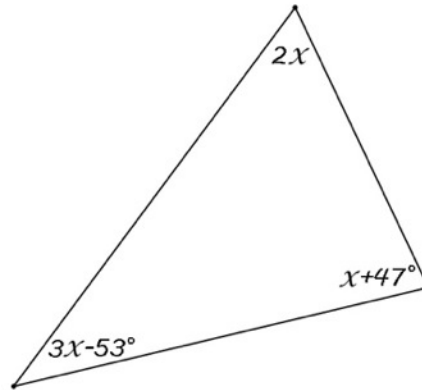
$$\text{angle } B: 2x - 10^\circ = 2 \cdot 32^\circ - 10^\circ = 64^\circ - 10^\circ = 54^\circ$$

$$\text{angle } C: 3x - 2^\circ = 3 \cdot 32^\circ - 2^\circ = 96^\circ - 2^\circ = 94^\circ$$

So the three angles are $A = 32^\circ$, $B = 54^\circ$, and $C = 94^\circ$.

We check: the sum of the three angles is $32^\circ + 54^\circ + 94^\circ = 180^\circ$. We also check the connection between the angles: the measure of B is indeed ten degrees less than twice the measure of angle A : $54^\circ = 2 \cdot 32^\circ - 10^\circ$ and the measure of C is indeed two degrees less than three times the measure of angle A : $94^\circ = 3 \cdot 32^\circ - 2^\circ$. Thus our solution is correct.

5. Consider the triangle shown on the picture below.



a) Compute the value of x .

Solution: The three angles add up to 180° . This will give us an equation we can solve for x .

$$\begin{aligned}2x + 3x - 53^\circ + x + 47^\circ &= 180^\circ && \text{combine like terms} \\6x - 6^\circ &= 180^\circ && \text{add } 6^\circ \\6x &= 186^\circ && \text{divide by } 6 \\x &= 31^\circ\end{aligned}$$

b) Compute the measure of the angles in the triangle.

Solution: Now that we have the value of x , we can compute the measure of all three angles in the triangle.

$$\text{angle 1: } 2x = 2 \cdot 31^\circ = 62^\circ$$

$$\text{angle 2: } 3x - 53^\circ = 3 \cdot 31^\circ - 53^\circ = 40^\circ$$

$$\text{angle 3: } x + 47^\circ = 31^\circ + 47^\circ = 78^\circ$$