

# Topic 1

## Basic Geometry and Triangles

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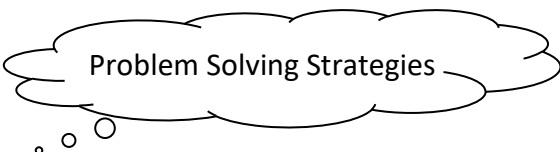
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<b>Vocabulary Word</b>	<b>Definition</b>	<b>Picture</b>
Angle		
Acute Angle		
Obtuse Angle		
Right Angle		
Congruent Angles		
Adjacent Angles		

<b>Vocabulary Word</b>	<b>Definition</b>	<b>Picture</b>
Angle Bisector		
Supplementary Angles		
Complementary Angles		
Vertical Angles		
Linear Pair		

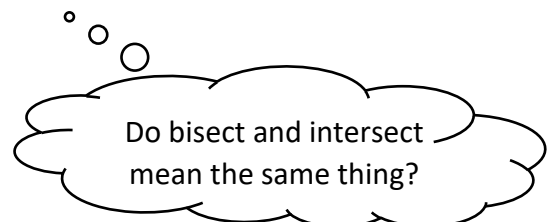
## Examples

- 1) Angles 1 and 2 are complementary. If  $m\angle 1 = 3x - 23$  and  $m\angle 2 = 4x + 1$ , find the value of  $x$  and the measures of the angles.
- 2) Angles 3 and 4 are supplementary. If  $m\angle 3 = 75 - x$  and  $m\angle 4 = 10x - 3$ , find the value of  $x$  and the measures of the angles.
- 3) An angle is four more than three times its supplement. Find the measure of both angles.
- 4)  $\angle ABC$  and  $\angle CBD$  are a linear pair. The measure of  $\angle ABC$  is twelve less than twice the measure of  $\angle CBD$ . Find the measure of the smaller angle.



- 5)  $\overrightarrow{QS}$  bisects  $\angle PQR$ . If  $m\angle PQR = 6y - 28$  and  $m\angle RQS = 2y + 1$ , find  $m\angle PQR$ .
- 6)  $\angle JKL$  is a right angle. If  $m\angle JKL = \frac{1}{3}x + 4$ , find the value of  $x$ .

- 7)  $\angle ABC$  is formed by adjacent angles  $\angle ABD$  and  $\angle CBD$ . If  $m\angle ABC = 62$ ,  $m\angle ABD = 4x - 2$ , and  $m\angle CBD = x - 1$ , find the measure of both angles.
- 8)  $\overleftrightarrow{AC}$  and  $\overleftrightarrow{BD}$  intersect at  $E$ . If  $m\angle AED = 2x - 9$  and  $m\angle BEC = 89$ , find the value of  $x$ .

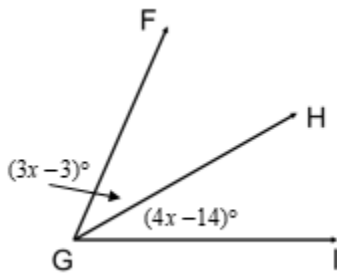


## Challenge!

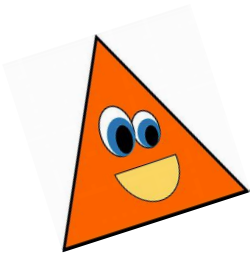
- 9) Two complementary angles are in the ratio of 7:8. What is the number of degrees in the smaller angle?
- 10)  $\overrightarrow{BD}$  bisects  $\angle ABC$ . If  $m\angle ABD = 2x^2$  and  $m\angle CBD = x^2 + 4x$ , find  $m\angle ABC$

## Practice

- 1)  $\overrightarrow{GH}$  bisects  $\angle FGI$ . Find  $m\angle FGI$ .



- 2) The measure of the supplement of an angle is 30 degrees more than twice the measure of the angle. Find the degree measure of the angle.



# Triangles

	Definition	Picture
Scalene		
Isosceles		
Equilateral		
Right		

★ The sum of the angles of a triangle is always \_\_\_\_\_ ★



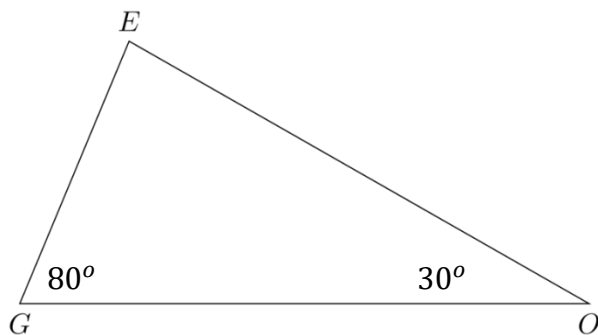


- 4) In right triangle  $\triangle ABC$ ,  $\angle B$  is a right angle. If  $m\angle A = 3x + 12$  and  $m\angle C = 2x - 2$ , find the measure of each angle in  $\triangle ABC$ .

- 5) In equilateral triangle  $\triangle EFG$ ,  $m\angle E = 2x - 12$ . Find the value of  $x$ .

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## Side and Angle Relationships



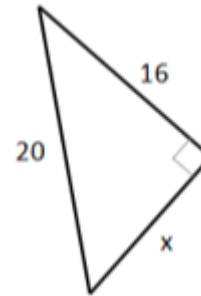
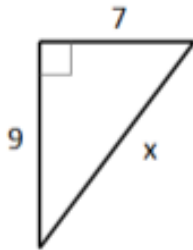
Shortest side  $\longrightarrow$  Longest Side

Smallest Angle  $\longrightarrow$  Largest Angle



## Finding the Third Side of a Right Triangle

Find the length of the third side of the triangles below to the nearest hundredth.



Given a rectangle with a width of 8 cm and a length of 12 cm, find the length of the diagonal to the nearest tenth.

A painter leans a 12-foot ladder up against a wall. If the base of the ladder is 5 feet away from the wall, how high up the wall, to the nearest tenth, does the ladder reach?

**What is a perfect square?**

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**What is simplest radical form?**

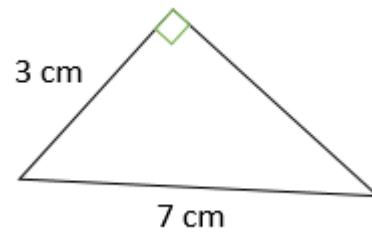
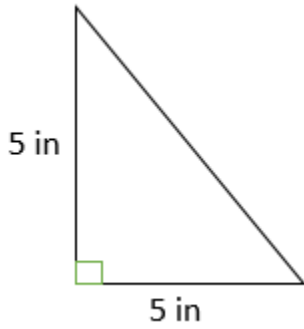
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Find the length of the third side of the triangles below in simplest radical form.



**Prove it's a right triangle:**

A triangle has sides with lengths of 3 mm, 4 mm, and 5 mm. Is this triangle a right triangle? Justify.

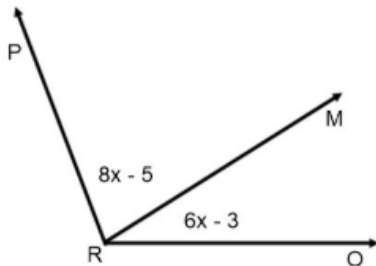
A triangle has sides with lengths of 6 cm, 12 cm, and 13 cm. Is this triangle a right triangle? Justify.

## Mixed Review

1)  $\angle 1$  and  $\angle 2$  are complementary. If  $m\angle 1 = 2x - 1$  and  $m\angle 2 = 4x - 5$ , find  $m\angle 2$

2)  $\angle 1$  and  $\angle 2$  are supplementary. If  $m\angle 1$  is six less than five times  $m\angle 2$ , find  $m\angle 1$

3) If  $m\angle PRO = 132^\circ$ , find  $m\angle PRM$

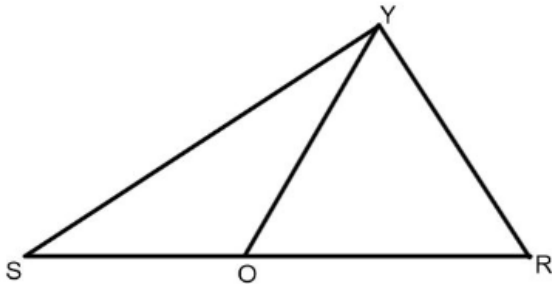


4)  $\overline{ST}$  and  $\overline{MR}$  intersect at A. If  $m\angle SAM = 9x + 7$  and  $m\angle RAT = 12x - 11$ , find  $m\angle SAM$  and  $m\angle MAT$ .

5)  $\angle LOV$  is bisected by  $\overrightarrow{OE}$ . If  $m\angle LOV = 68^\circ$ , and  $m\angle LOE = 5x - 1$ , find  $x$ .

6) The measures of the angles of a triangle can be represented by the expressions  $14x$ ,  $6x - 10$ , and  $4x + 10$ . Find the value of  $x$ . What type of triangle is this?

7)  $\triangle YOR$  is isosceles with  $\overline{YR} \cong \overline{OR}$  and  $m\angle YRS = 80^\circ$ . If  $m\angle YSR = 32^\circ$ , find  $m\angle SYO$

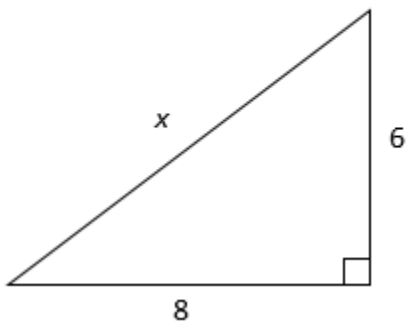


8)  $\triangle FOX$  is a right triangle with a right angle at  $\angle O$ . If  $m\angle F = x - 2$  and  $m\angle X = 4x - 3$ , find the measure of the smallest angle. What side is the shortest side?

- 9)  $\triangle HAT$  is an isosceles triangle with  $\overline{HA} \cong \overline{TA}$ . The measure of the vertex angle is  $x + 15$  and the measure of each of the base angles is  $2x - 5$ . Find the value of  $x$ .

- 10) In  $\triangle ABC$ ,  $m\angle A = 41^\circ$ ,  $m\angle B = x + 14$ , and  $m\angle C = 5x + 11$ , find the value of  $x$  and identify the longest side of  $\triangle ABC$ .

- 11) Find the length of the missing side in simplest radical form.



- 12) Find the length of the missing side in simplest radical form.

