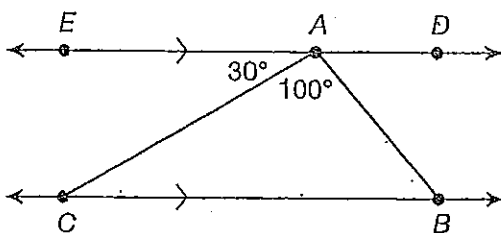


Angle Sum of Triangles

The angle sum of a triangle is always 180° . One way to show this is to make a line that goes through one vertex of the triangle and is parallel to the opposite side.

Example

Lines AD and BC are parallel. What are the measures of $\angle ABC$ and $\angle ACB$?



Since alternate interior angles are congruent, $m\angle ACB = 30^\circ$.

The angle measure of a straight line is 180° . Using this information, find $m\angle DAB$.

$$180^\circ = m\angle DAB + m\angle BAC + m\angle CAE$$

$$180^\circ = m\angle DAB +$$

$$180^\circ = m\angle DAB +$$

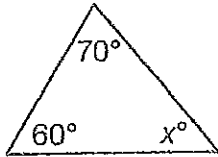
$$= m\angle DAB$$

Since alternate interior angles are congruent, $m\angle ABC =$

Practice

Write an equation that could be used to find the value of x for each triangle.

1.

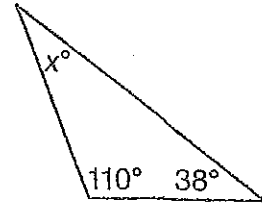


2.



REMEMBER A right angle is 90° .

3.



State whether or not it is possible to draw a triangle with the given interior angle measures.

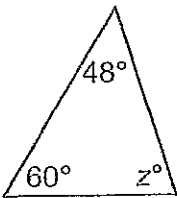
4. $45^\circ, 55^\circ, 80^\circ$

5. $30^\circ, 60^\circ, 100^\circ$

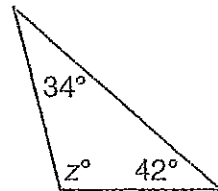
6. $12^\circ, 84^\circ, 84^\circ$

Find the value of z for each triangle. Show your work.

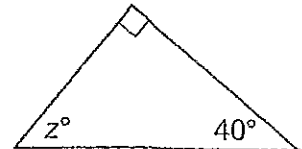
7.



8.

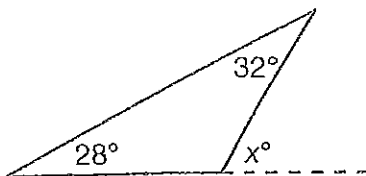


9.

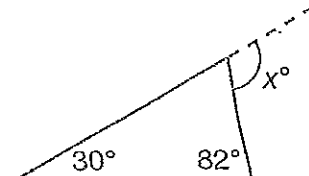


Find the value of x for each triangle. Show your work.

10.

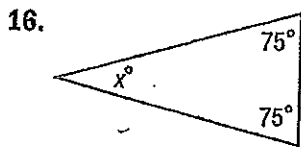


11.



Extra Practice

Find the value of x in each triangle with the given angle measures.



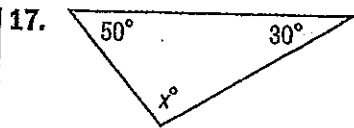
$$x + 75 + 75 = 180$$

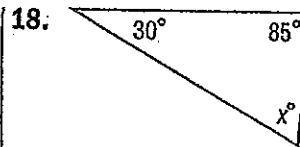
$$x + 150 = 180$$

$$x = 30$$

30 _____

Homework Help





19. $70^\circ, 60^\circ, x^\circ$ _____

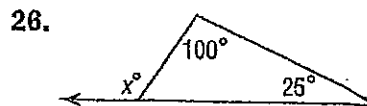
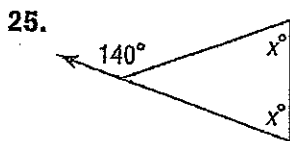
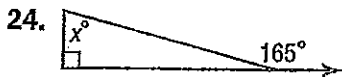
20. $x^\circ, 60^\circ, 25^\circ$ _____

21. $x^\circ, 35^\circ, 25^\circ$ _____

22. The measures of the angles of $\triangle DEF$ are in the ratio 2:4:4. What are the measures of the angles?

23. The measures of the angles of $\triangle XYZ$ are in the ratio 4:5:6. What are the measures of the angles?

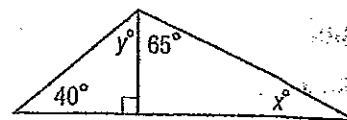
Copy and Solve Find the value of x in each triangle. Show your work on a separate sheet of paper.



27. **Reason Inductively** Apply what you know about angles and lines to find the values of x and y in the figure at the right.

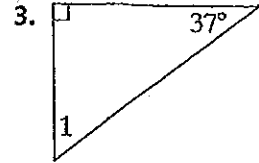
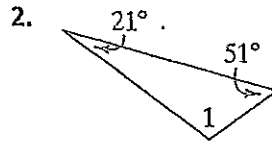
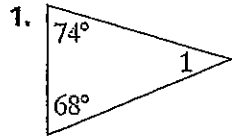
$x =$ _____

$y =$ _____



Check Your Understanding

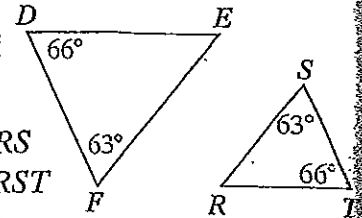
For each triangle, find $m\angle 1$.



Use the triangles below for Exercises 4 and 5.

4. List the congruent corresponding angles of the two triangles.

5. **Error Analysis** Daisy writes $\triangle DEF \sim \triangle TRS$ by AA similarity. Erika writes $\triangle DEF \sim \triangle RST$ by AA similarity. Who is incorrect? Explain.



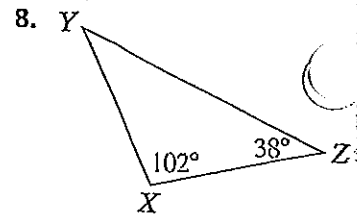
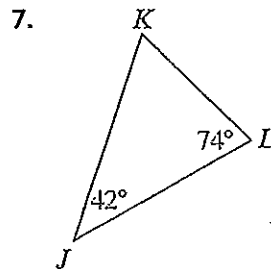
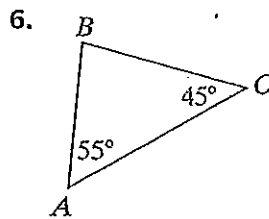
Homework Exercises

For more exercises, see Extra Skills and Word Problems.

Determine the unknown angle measure in each triangle.

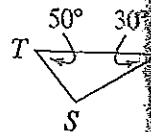
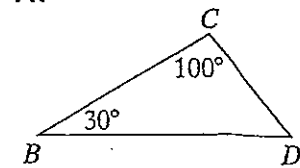
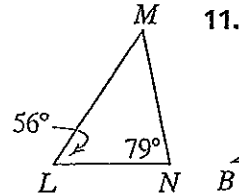
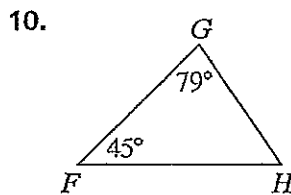
GO for Help

For Exercises	See Examples
6–9	1
10–11	2



9. A triangular flag has two angles that each measure 74° . What is the measure of the third angle of the flag?

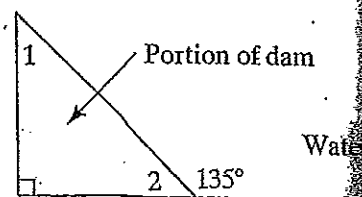
Show that each pair of triangles is similar.



GPS

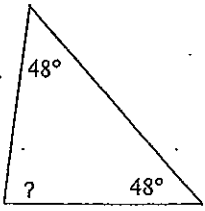
12. **Guided Problem Solving** The diagram shows a cross-section of a portion of a dam. What is the measure of $\angle 1$?

- What is the relationship between $\angle 2$ and the 135° angle?
- How can you find the measure of $\angle 2$?
- Once you know the measure of $\angle 2$, how can you find the measure of $\angle 1$?

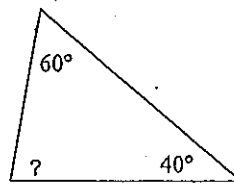


Find the measure of each angle indicated showing work.

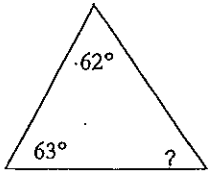
12)



13)

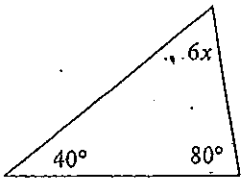


14)



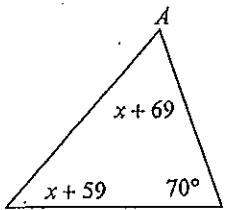
Write an equation and solve for x.

15)

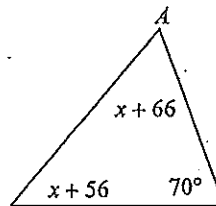


Write an equation and solve for x. Then, find the measure of any angle not given to you in the diagram

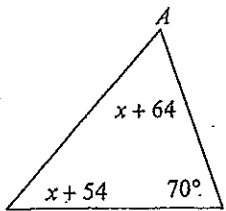
16)



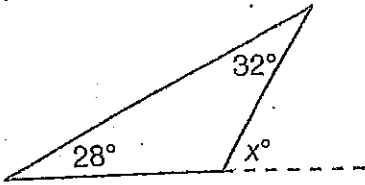
17)

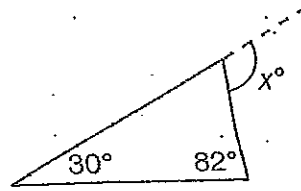


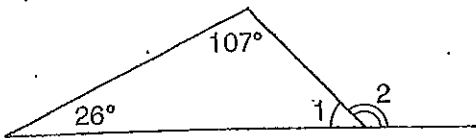
18)



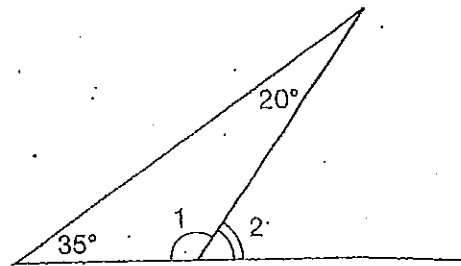
Find the value of x for each triangle. Show your work.



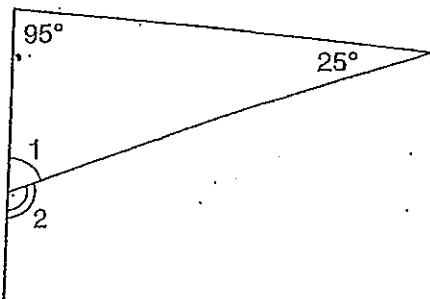




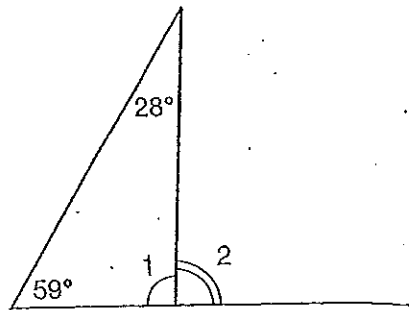
$m\angle 2 =$ _____



$m\angle 2 =$ _____



$m\angle 2 =$ _____



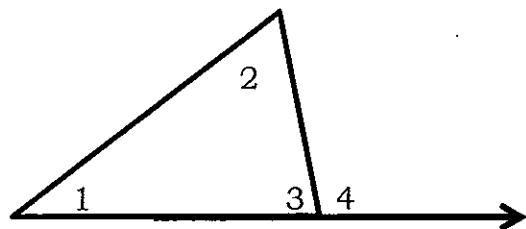
$m\angle 2 =$ _____

Name _____

Exterior Angle Theorem Notes

(Objective:

An _____ angle of a triangle is formed by two sides of the triangle. An _____ angle is formed by one side of the triangle and the extension of an adjacent side. Each _____ angle has two _____ interior angles. Remote interior angles are _____ angles that are not adjacent to the exterior angle.

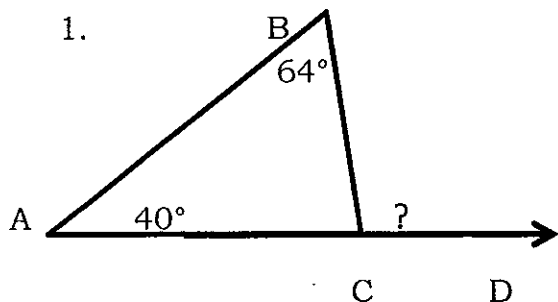


- $\angle 1$, $\angle 2$, and $\angle 3$ are _____ angles.
- $\angle 4$ is an _____ angle.
- _____ and _____ are remote interior angles to _____.

The *Exterior Angle Theorem* states that the measure of an _____ angle is equal to the _____ of its _____ angles.

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Let's Practice: Find the measure of the missing angle.



$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

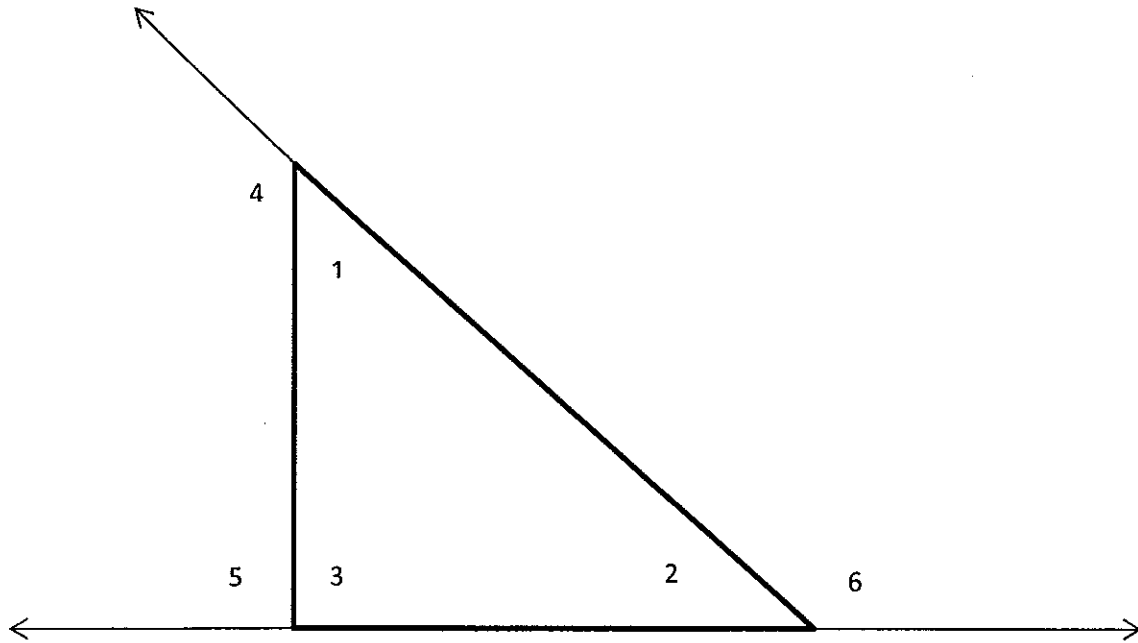
$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

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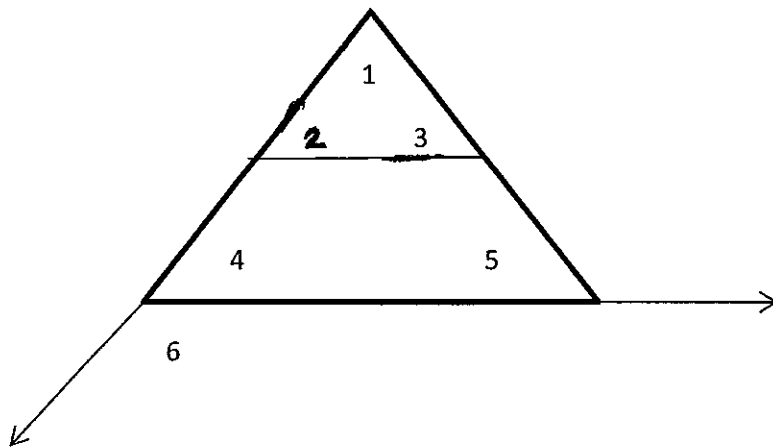
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Exterior Angles and Remote Interior Angles



Exterior Angle	Remote Interior Angles	Sum



Which are the remote interior angles of $\angle 6$?

(

(

1

(