Interactive Classroom

Glencoe

GEOMETRY

LESSON 4–1 Classifying Triangles

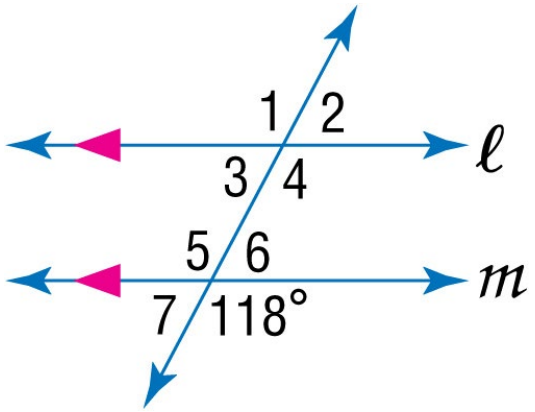
Mc Graw Hill

Lesson Menu

5-Minute Check Over Chapter 3

CheckPoint

1 What is the special name given to the pair of angles shown by ∠2 and ∠6?



A. consecutive interior angles

B. corresponding angles

C. complementary angles

D. supplementary

5-Minute Check Over Chapter 3

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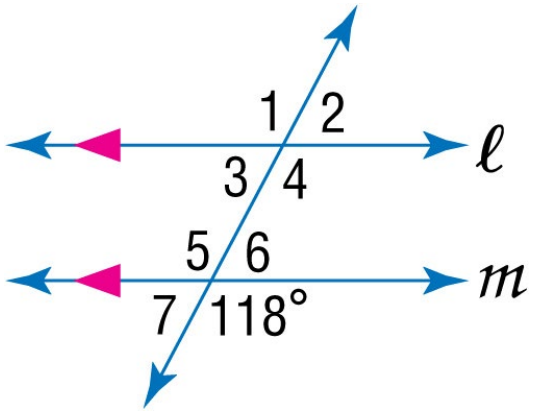
2 Find $m\angle 3$.



A. 118

B. 108

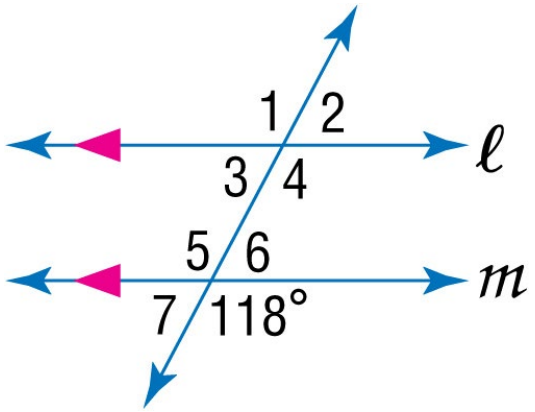
C. 62

D. 52

5-Minute Check Over Chapter 3

CheckPoint

3 Find $m\angle 4$.



A. 118

B. 108

C. 72

D. 62

5-Minute Check Over Chapter 3

CheckPoint

4 Find the slope of the line that contains the points at (4, 4) and (2, –5).

A. $-\frac{9}{2}$

B. $-\frac{4}{5}$

C. $\frac{4}{5}$

→ D. $\frac{9}{2}$

5-Minute Check

Over Chapter 3

CheckPoint

Standardized Test Practice

5 Write the equation in slope-intercept form of a line that has a slope of $\frac{3}{4}$ and contains the point at $(0, 5)$.

A. $y = 5x + \frac{3}{4}$

B. $y = \frac{3}{4}x - 5$

C. $y = \frac{3}{4}x + 5$

D. $y = \frac{3}{4}x$

Content Standards

G.CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).

Mathematical Practices

2 Reason abstractly and quantitatively.

6 Attend to precision.

Then

You measured and classified angles.

Now

- Identify and classify triangles by angle measures.
- Identify and classify triangles by side measures.

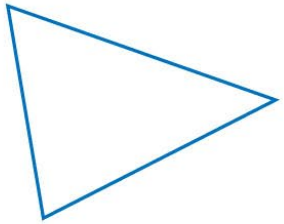
New Vocabulary

- acute triangle
- equiangular triangle
- obtuse triangle
- right triangle
- equilateral triangle
- isosceles triangle
- scalene triangle

Classifying Triangles

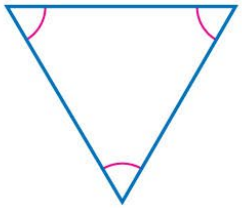
KeyConcept Classifications of Triangles by Angles

acute triangle



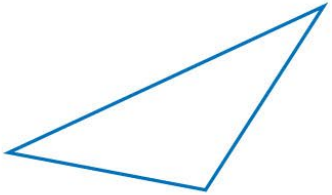
3 acute angles

equiangular triangle



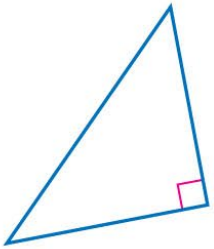
3 congruent acute angles

obtuse triangle



1 obtuse angle

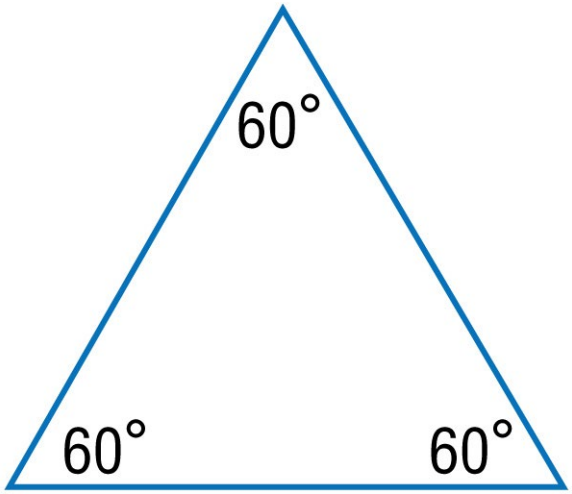
right triangle



1 right angle

EXAMPLE 1 Classify Triangles by Angles

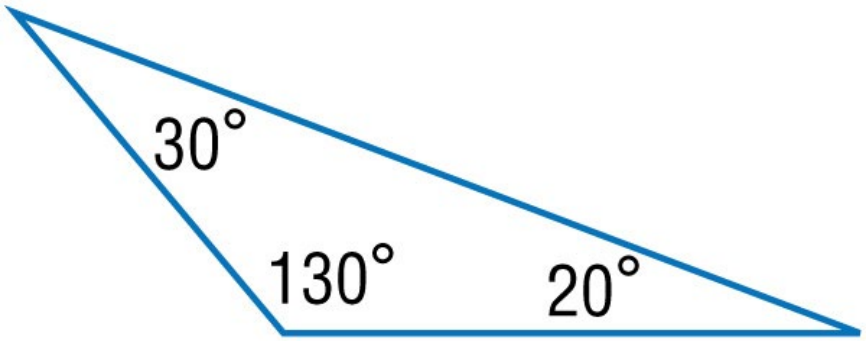
A. Classify the triangle as *acute*, *equiangular*, *obtuse*, or *right*.



Answer: The triangle has three congruent angles. It is an equiangular triangle.

EXAMPLE 1 Classify Triangles by Angles

B. Classify the triangle as *acute*, *equiangular*, *obtuse*, or *right*.

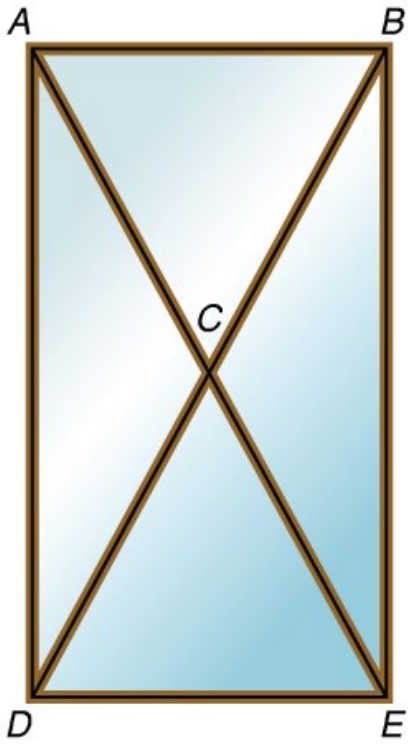


Answer: One angle of the triangle measures 130°, so it is an obtuse angle. The triangle has an obtuse angle, so it is an obtuse triangle.

EXAMPLE 1 Check Your Progress

CheckPoint

A. ARCHITECTURE The frame of this window design is made up of many triangles. Classify ΔACD.



A. acute

B. equiangular

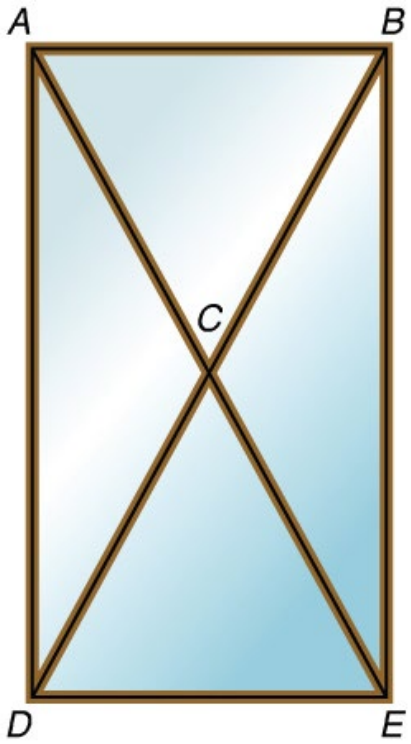
C. obtuse

D. right

EXAMPLE 1 Check Your Progress

CheckPoint

B. ARCHITECTURE The frame of this window design is made up of many triangles. Classify ΔADE.



A. acute

B. equiangular

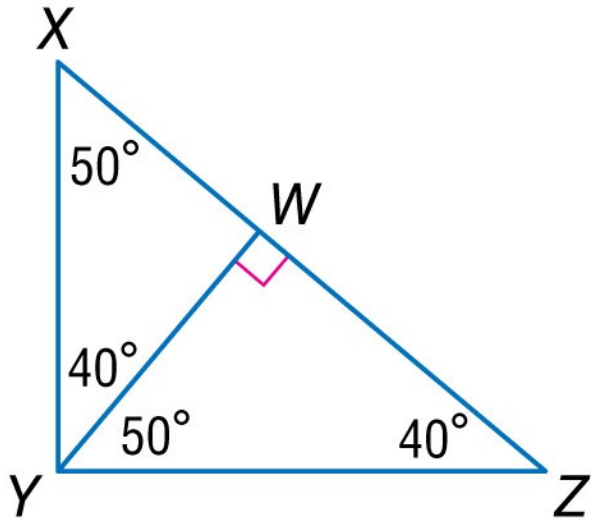
C. obtuse

D. right

EXAMPLE 2 Classify Triangles by Angles Within Figures

Classify ΔXYZ as *acute, equiangular, obtuse,* or *right.* Explain your reasoning.

Point W is in the interior of $\angle XYZ$, so by the Angle Addition Postulate, $m\angle XYW + m\angle WYZ = m\angle XYZ$. By substitution, $m\angle XYZ = 40 + 50 = 90$.

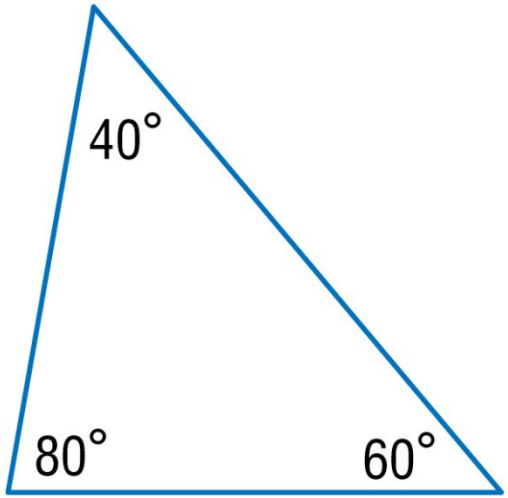


Answer: Since ΔXYZ has a right angle, it is a right triangle.

EXAMPLE 2 Check Your Progress

CheckPoint

Classify ΔACD as *acute, equiangular, obtuse,* or *right.*



A. acute

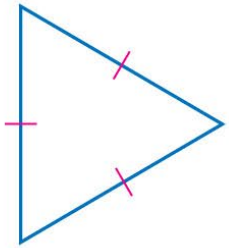
B. equiangular

C. obtuse

D. right

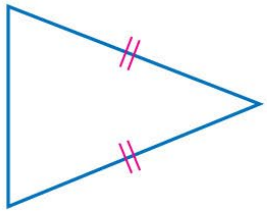
KeyConcept Classifications of Triangles by Sides

equilateral triangle



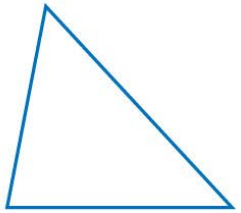
3 congruent sides

isosceles triangle



at least 2 congruent sides

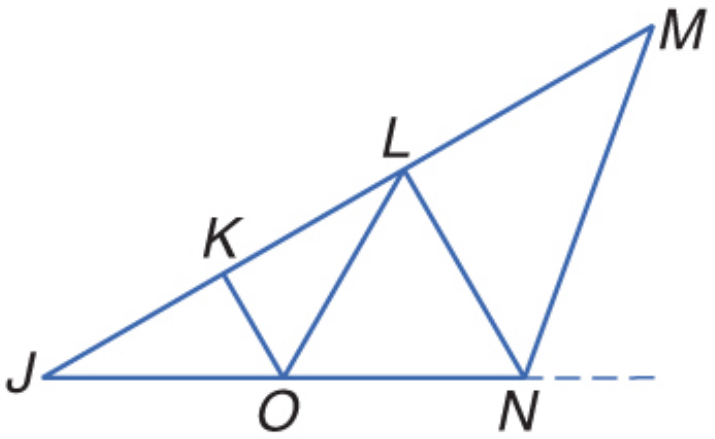
scalene triangle



no congruent sides

Real-World Example 3 Classify Triangles by Sides

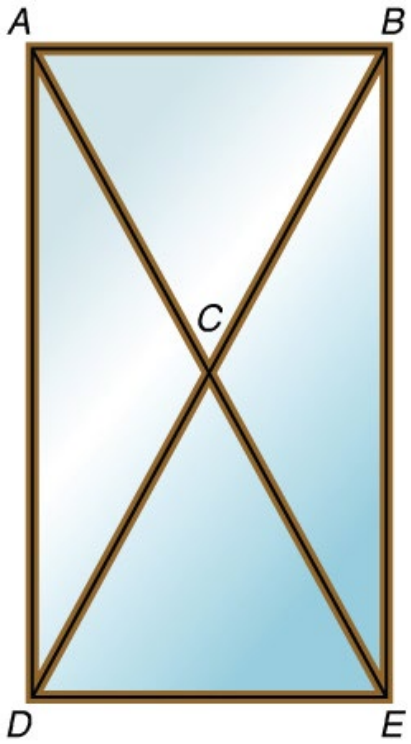
ARCHITECTURE The triangle truss shown is modeled for steel construction. Classify ΔJMN, ΔJKO, and ΔOLN as *equilateral, isosceles, or scalene.*



Answer: ΔJMN has no congruent sides, so it is a scalene triangle. ΔJKO has no congruent sides, so it is a scalene triangle. ΔOLN has all sides congruent, so it is an equilateral triangle.

Real-World Example 3 | Check Your Progress | CheckPoint

ARCHITECTURE The frame of this window design is made up of many triangles. Classify ΔABC.



A. isosceles

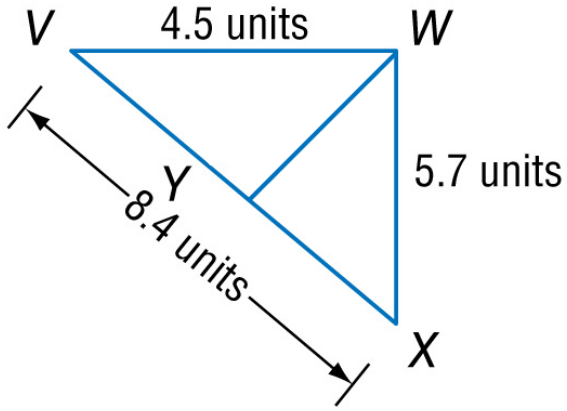
B. equilateral

C. scalene

D. right

EXAMPLE 4 Classify Triangles by Sides Within Figures

If point *Y* is the midpoint of $\overline{VX}$, and *WY* = 3.0 units, classify Δ*VWY* as *equilateral*, *isosceles*, or *scalene*. Explain your reasoning.



By the definition of midpoint, *VY* = *YX*.

VY + *YX*	=	*VX*	Segment Addition Postulate
VY + *VY*	=	8.4	Substitution
2*VY*	=	8.4	Simplify.
VY	=	4.2	Divide each side by 2.

EXAMPLE 4 Classify Triangles by Sides Within Figures

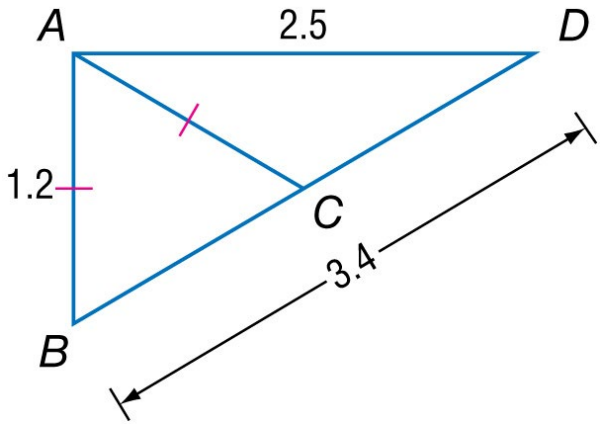
So, $VW = 4.5$ units, $WY = 3.0$ units, and $VY = 4.2$ units.

Answer: Since all three sides have different lengths, the triangle is scalene.

EXAMPLE 4 Check Your Progress

CheckPoint

If point C is the midpoint of $\overline{BD}$, classify ΔABC as *equilateral*, *isosceles*, or *scalene*.



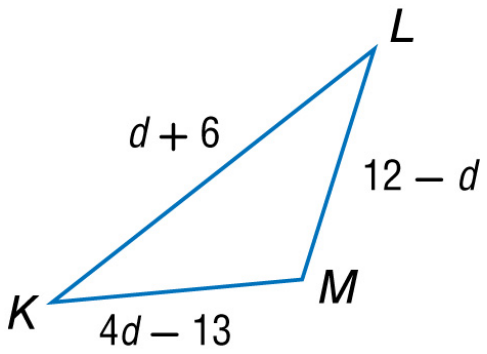
A. equilateral

B. isosceles

C. scalene

EXAMPLE 5 Finding Missing Values

ALGEBRA Find the measures of the sides of isosceles triangle *KLM* with base $\overline{KL}$.



Step 1 Find *d*.

$KM = ML$	Given
$4d - 13 = 12 - d$	Substitution
$5d - 13 = 12$	Add *d* to each side.
$5d = 25$	Add 13 to each side.
$d = 5$	Divide each side by 5.

EXAMPLE 5 Finding Missing Values

Step 2 Substitute to find the length of each side.

$KM = 4d - 13$		Given
$= 4(5) - 13$ or 7		$d = 5$
$ML = KM$		Given
$= 7$		$KM = 7$
$KL = d + 6$		Given
$= 5 + 6$ or 11		$d = 5$

Answer: $KM = ML = 7$, $KL = 11$

EXAMPLE 5 Check Your Progress

CheckPoint

ALGEBRA Find x and the measure of each side of equilateral triangle ABC if $AB = 6x - 8$, $BC = 7 + x$, and $AC = 13 - x$.

A. $x = 10$; all sides are 3.

B. $x = 6$; all sides are 13.

C. $x = 3$; all sides are 10.

D. $x = 3$; all sides are 16.

Glencoe

GEOMETRY

Click the mouse button to return to the lesson menu.