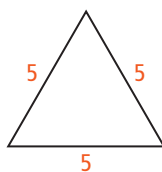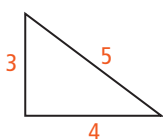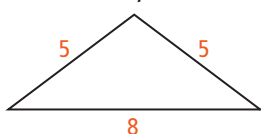### Vocabulary

● Review

Underline the correct word to complete each sentence.

1. An *equilateral* triangle has two/ three congruent sides.

2. An *equilateral* triangle has acute / obtuse angles.
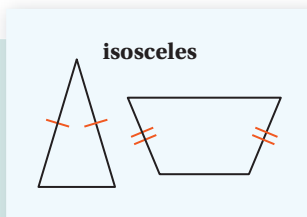
3. Circle the *equilateral* triangle.

● Vocabulary Builder

isosceles (adjective) **eye SAHS uh leez**
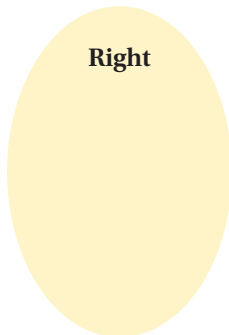
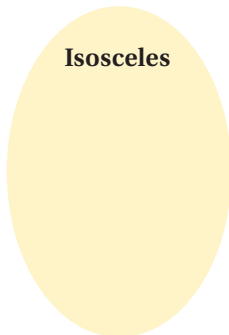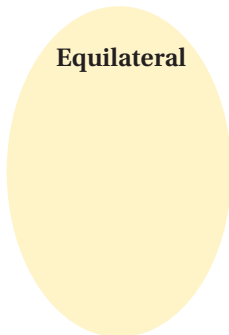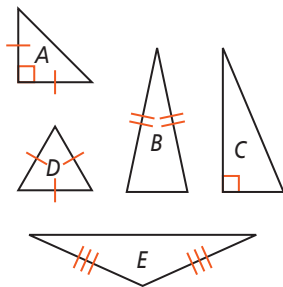**Related Words:** equilateral, scalene

Definition A triangle is **isosceles** if it has two congruent sides.

Main Idea: The angles and sides of **isosceles** triangles have special relationships.

isosceles

● Use Your Vocabulary

4. Use the triangles below. Write the letter of each triangle in the correct circle(s) at the right.

Equilateral	Isosceles	Right

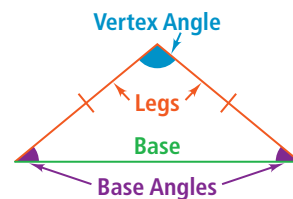## Theorems 4–3, 4–4, 4–5

Theorem 4-3 Isosceles Triangle Theorem

If two sides of a triangle are congruent, then the angles opposite those sides are congruent.

Theorem 4-4 Converse of Isosceles Triangle Theorem

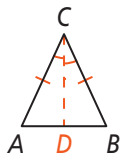If two angles of a triangle are congruent, then the sides opposite those angles are congruent.

Theorem 4-5

If a line bisects the vertex angle of an isosceles triangle, then the line is also the perpendicular bisector of the base.
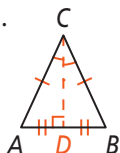
5. If $\overline{PQ} \cong \overline{RQ}$ in $\triangle PQR$, then $\angle$ [   ] $\cong \angle$ [   ] .

6. Underline the correct theorem number to complete the sentence.

The theorem illustrated below is Theorem 4–3 / 4–4 / 4–5 .

If . . .

Then . . .

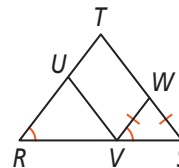
Problem 1 Using the Isosceles Triangle Theorems

Got It? **Is $\angle WVS$ congruent to $\angle S$? Is $\overline{TR}$ congruent to $\overline{TS}$? Explain.**

7. The markings show that $\overline{WV} \cong$ [   ] .

8. Is $\angle WVS \cong \angle S$? Explain.

9. Is $\angle R \cong \angle S$? Explain.

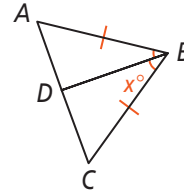**10.** Is $\overline{TR} \cong \overline{TS}$? Explain.

Problem 2 Using Algebra

Got It? Suppose $m\angle A = 27$. What is the value of x?

11. Since $\overline{CB} \cong$ ⬚ , $\triangle ABC$ is isosceles.

12. Since $\triangle ABC$ is isosceles, $m\angle A = m\angle$ ⬚ $=$ ⬚ .

13. Since $\overline{BD}$ bisects the vertex of an isosceles triangle, $\overline{BD} \perp$ ⬚

    and $m\angle BDC =$ ⬚ .

14. Use the justifications below to find the value of x.

$m\angle$ ⬚ $+ m\angle BDC + x = 180$	Triangle Angle-Sum Theorem
⬚ $+$ ⬚ $+ x = 180$	Substitute.
⬚ $+ x = 180$	Simplify.
$x =$ ⬚	Subtract 117 from each side.

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take note

Corollaries to Theorems 4–3 and 4–4

Corollary to Theorem 4-3

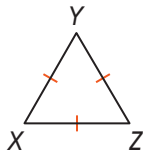If a triangle is equilateral, then the triangle is equiangular.

Corollary to Theorem 4-4

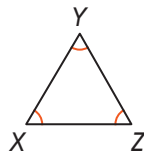If a triangle is equiangular, then the triangle is equilateral.

15. Underline the correct number to complete the sentence.

    The corollary illustrated below is Corollary to Theorem 4-3 / 4-4 .

    If . . .   Then . . .

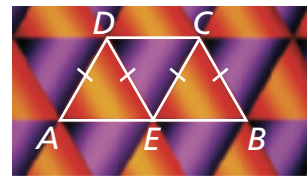## Problem 3 Finding Angle Measures

Got It? Suppose the triangles at the right are isosceles triangles, where $\angle ADE$, $\angle DEC$, and $\angle ECB$ are vertex angles. If the vertex angles each have a measure of 58, what are $m\angle A$ and $m\angle BCD$?

16. Which triangles are congruent by the Side-Angle-Side Theorem?

17. Which angles are congruent by the Isosceles Triangle Theorem?

18. By the Triangle Angle-Sum Theorem, $m\angle A + 58 + m\angle DEA = $ ◻ .

19. Solve for $m\angle A$.

20. Since ◻ $\cong \angle ECD$, $m\angle ECD = $ ◻ .

21. Using the Angle Addition Postulate, $m\angle BCD = 58 + m\angle ECD = $ ◻ .

✓ Lesson Check • Do you UNDERSTAND?

What is the relationship between sides and angles for each type of triangle?

       isosceles   **equilateral**

Complete.

22. An isosceles triangle has ◻ congruent sides.

23. An equilateral triangle has ◻ congruent sides.

Complete each statement with *congruent, isosceles,* or *equilateral*.

24. The Isosceles Triangle Theorem states that the angles opposite the congruent sides are __?__.

25. Equilateral triangles are also __?__ triangles.

26. The sides and angles of an __?__ triangle are __?__.

✓ Math Success

Check off the vocabulary words that you understand.

☐ corollary   ☐ legs of an isosceles triangle   ☐ base of an isosceles triangle

        ☐ vertex angle of an isosceles triangle   ☐ base angles of an isosceles triangle

Rate how well you understand *isosceles and equilateral triangles*.

Need to review   0   2   4   6   8   10   Now I get it!

Lesson 4-5