NAME Homework 4.1 DATE _____ PERIOD _____

4-1 Study Guide and Intervention

Classifying Triangles

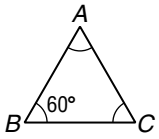
Classify Triangles by Angles One way to classify a triangle is by the measures of its angles.

• If *one* of the angles of a triangle is an obtuse angle, then the triangle is an **obtuse triangle**.
• If *one* of the angles of a triangle is a right angle, then the triangle is a **right triangle**.
• If *all three* of the angles of a triangle are acute angles, then the triangle is an **acute triangle**.
• If all three angles of an acute triangle are congruent, then the triangle is an **equiangular triangle**.

Lesson 4-1

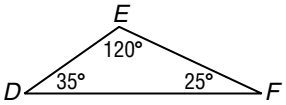
Example **Classify each triangle.**

a.



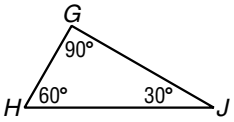
All three angles are congruent, so all three angles have measure 60°. The triangle is an equiangular triangle.

b.



The triangle has one angle that is obtuse. It is an obtuse triangle.

c.

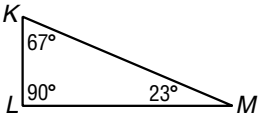


The triangle has one right angle. It is a right triangle.

Exercises

Classify each triangle as *acute*, *equiangular*, *obtuse*, or *right*.

1.



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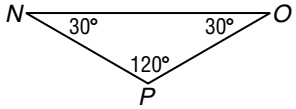

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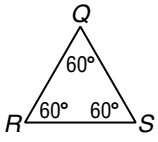

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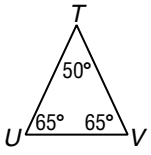

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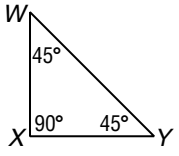

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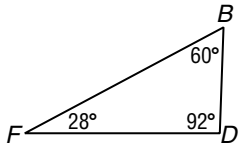


NAME _____ DATE _____ PERIOD _____

Homework 4.1

4-1 Study Guide and Intervention *(continued)*

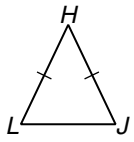
Classifying Triangles

Classify Triangles by Sides You can classify a triangle by the measures of its sides. Equal numbers of hash marks indicate congruent sides.

• If *all three* sides of a triangle are congruent, then the triangle is an **equilateral triangle**.
• If *at least two* sides of a triangle are congruent, then the triangle is an **isosceles triangle**.
• If *no two* sides of a triangle are congruent, then the triangle is a **scalene triangle**.

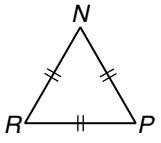
Example **Classify each triangle.**

a.



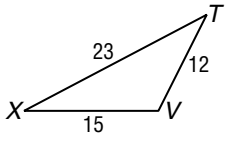
Two sides are congruent. The triangle is an isosceles triangle.

b.



All three sides are congruent. The triangle is an equilateral triangle.

c.

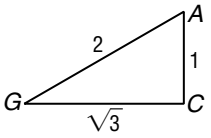


The triangle has no pair of congruent sides. It is a scalene triangle.

Exercises

Classify each triangle as *equilateral*, *isosceles*, or *scalene*.

1.



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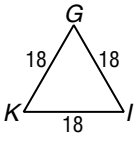

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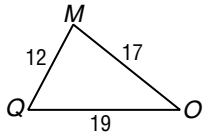

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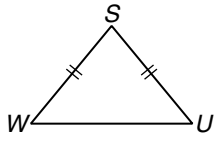

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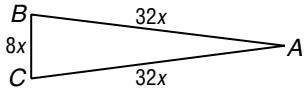

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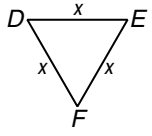

7. Find the measure of each side of equilateral $\triangle RST$ with $RS = 2x + 2$, $ST = 3x$, and $TR = 5x - 4$.

8. Find the measure of each side of isosceles $\triangle ABC$ with $AB = BC$ if $AB = 4y$, $BC = 3y + 2$, and $AC = 3y$.

9. Find the measure of each side of $\triangle ABC$ with vertices $A(-1, 5)$, $B(6, 1)$, and $C(2, -6)$. Classify the triangle.

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Homework 4.1

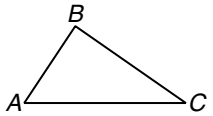
4-2 Study Guide and Intervention

Angles of Triangles

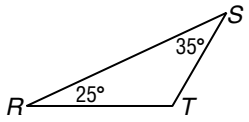
Angle Sum Theorem If the measures of two angles of a triangle are known, the measure of the third angle can always be found.

Angle Sum Theorem	The sum of the measures of the angles of a triangle is 180. In the figure at the right, $m\angle A + m\angle B + m\angle C = 180$.

Triangle Addition Theorem (TAT)

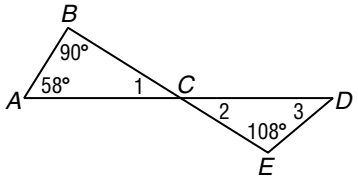


Example 1 **Find $m\angle T$.**



$m\angle R + m\angle S + m\angle T = 180$	Angle Sum Theorem
$25 + 35 + m\angle T = 180$	Substitution
$60 + m\angle T = 180$	Add.
$m\angle T = 120$	Subtract 60 from each side.

Example 2 **Find the missing angle measures.**



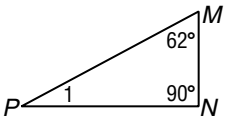
$m\angle 1 + m\angle A + m\angle B = 180$	Angle Sum Theorem
$m\angle 1 + 58 + 90 = 180$	Substitution
$m\angle 1 + 148 = 180$	Add.
$m\angle 1 = 32$	Subtract 148 from each side.
$m\angle 2 = 32$	Vertical angles are congruent.
$m\angle 3 + m\angle 2 + m\angle E = 180$	Angle Sum Theorem
$m\angle 3 + 32 + 108 = 180$	Substitution
$m\angle 3 + 140 = 180$	Add.
$m\angle 3 = 40$	Subtract 140 from each side.

Lesson 4-2

Exercises

Find the measure of each numbered angle.

1.



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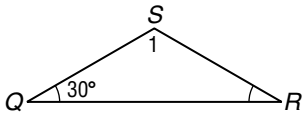
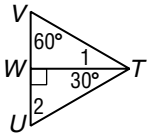


3.



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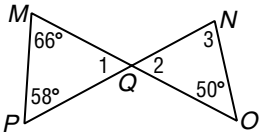

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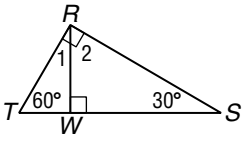

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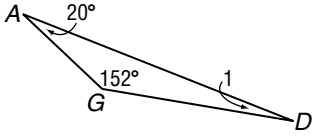


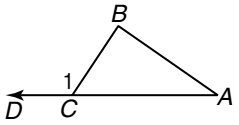
NAME _____ DATE _____ PERIOD _____

Homework 4.1

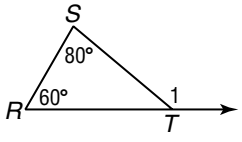
4-2 Study Guide and Intervention *(continued)*

Angles of Triangles

Exterior Angle Theorem At each vertex of a triangle, the angle formed by one side and an extension of the other side is called an **exterior angle** of the triangle. For each exterior angle of a triangle, the **remote interior angles** are the interior angles that are not adjacent to that exterior angle. In the diagram below, $\angle B$ and $\angle A$ are the remote interior angles for exterior $\angle DCB$.

Exterior Angle Theorem	The measure of an exterior angle of a triangle is equal to the sum of the measures of the two remote interior angles. $m\angle 1 = m\angle A + m\angle B$	

Example 1 **Find $m\angle 1$.**

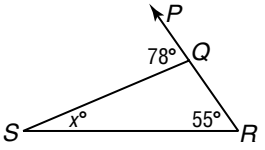


$m\angle 1 = m\angle R + m\angle S$ Exterior Angle Theorem

$= 60 + 80$ Substitution

$= 140$ Add.

Example 2 **Find x.**



$m\angle PQS = m\angle R + m\angle S$ Exterior Angle Theorem

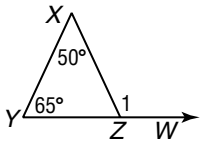
$78 = 55 + x$ Substitution

$23 = x$ Subtract 55 from each side.

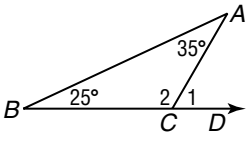
Exercises

Find the measure of each numbered angle.

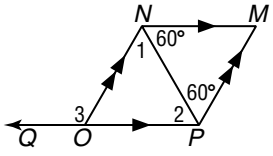
1.



2.



3.



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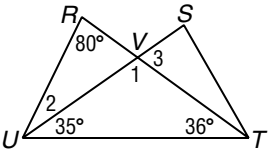
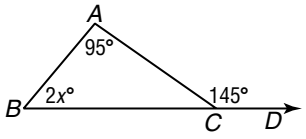
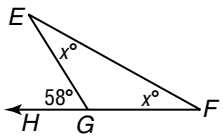


Find x.

5.



6.



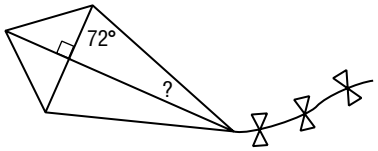
NAME _____ Homework 4.1 DATE _____ PERIOD _____

4-2 Practice

Angles of Triangles

Find the missing angle measures.

1.



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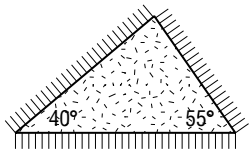
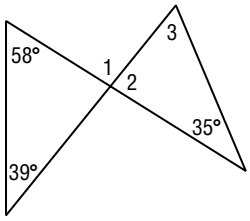


Find the measure of each angle.

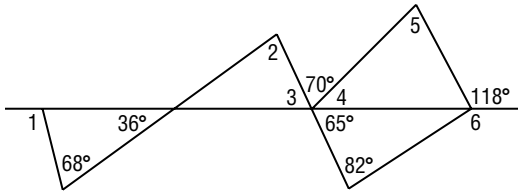


3. $m\angle 1$

4. $m\angle 2$

5. $m\angle 3$

Find the measure of each angle.



6. $m\angle 1$

7. $m\angle 4$

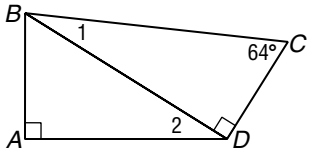
8. $m\angle 3$

9. $m\angle 2$

10. $m\angle 5$

11. $m\angle 6$

Find the measure of each angle if $\angle BAD$ and $\angle BDC$ are right angles and $m\angle ABC = 84$.



12. $m\angle 1$

13. $m\angle 2$

14. CONSTRUCTION The diagram shows an example of the Pratt Truss used in bridge construction. Use the diagram to find $m\angle 1$.