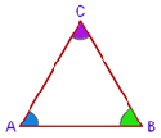
Triangle: A figure formed by three line segments that connect three noncollinear points.



△ABC

∠ABC

plane ABC

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You can classify a triangle in 2 ways:

1. Angles
2. Sides

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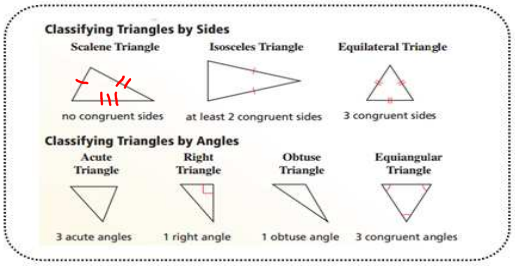

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Example 1: Classify each triangle by angles and sides

a)

isosceles
right

b)

equilateral
equiangular

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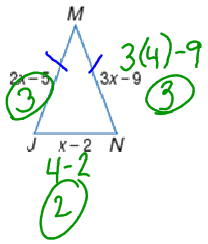
Example 2: **ALGEBRA** Find x, JM, MN, and JN if $\triangle JMN$ is an isosceles triangle with $\overline{JM} \cong \overline{MN}$.

$2x-5=3x-9$

$-5=x-9$

$+9 \quad +9$

$4=x$



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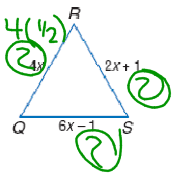
Example 3: **ALGEBRA** Find x, QR, RS, and QS if $\triangle QRS$ is an equilateral triangle.

$4x=2x+1$

$2x=1$

$x=1/2$



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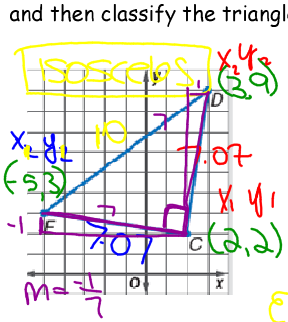
Example 4: Find the measure of each side of the triangle and then classify the triangle by its sides.



Isosceles

$CD = \sqrt{(3-2)^2+(9-2)^2} = \sqrt{1^2+7^2} = \sqrt{1+49} = \sqrt{50} = 7.07$

$EC = \sqrt{(-5-2)^2+(3-2)^2} = \sqrt{-7^2+1^2} = \sqrt{49+1} = \sqrt{50} = 7.07$

$ED = \sqrt{(3-5)^2+(9-3)^2} = \sqrt{8^2+6^2} = \sqrt{64+36} = \sqrt{100} = 10$

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Triangle Sum Theorem: The sum of the measures of the interior angles in a triangle is 180°.

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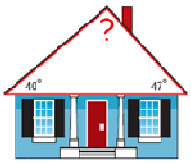
Example 1: Find the missing angles in each triangle.



40 + 47 = 87

180 − 87 = 93°

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$180 = 2x + 39$

$180 - 39 = 141$

$141 \div 2 = 70.5°$

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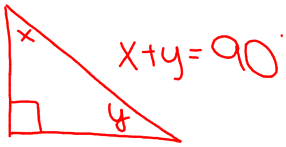
Corollary to the Triangle Exterior Angle Theorem:
The acute angles of a right triangle are **complementary**.



$x + y = 90$

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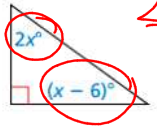
Example 6: Solve for x.



$2x + x - 6 = 90$

$3x - 6 = 90$

$3x = 96$

$x = 32$

$2x + x - 6 + 90 = 180$

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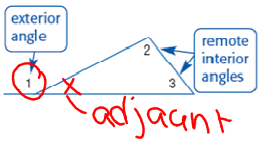
Exterior Angle of a Triangle: an angle formed by **extending** one of the sides of the triangle.



Remote Interior Angle of a Triangle: The two angles that are NOT **next** to the exterior angle.

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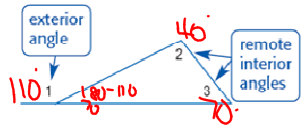
Triangle Exterior Angle Theorem: The measure of an exterior angle of a triangle is **equal** to the **sum** of the two **remote interior** angles.



$m\angle 2 + m\angle 3 = m\angle 1$

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Example 7: Find the missing angle measures.

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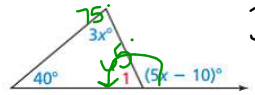
Example 8: Solve for x and find the m∠1.



$3x + 40 = 5x - 10$

$40 = 2x$

$50 = 2x$

$25 = x$

$40 + 75 = 115$

$180 - 115 = 65$

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