Geometry 4.6

Use properties of isosceles* triangles

Use properties of equilateral* triangles

*6th grade standard

isosceles 2 ≅ sides

leg "

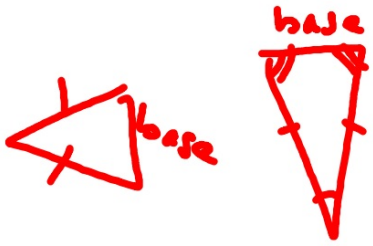
base non ≅ side

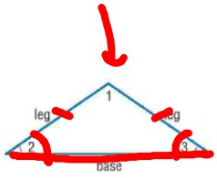
vertex angle

base angle

equilateral

corollary

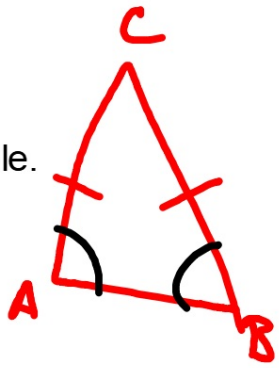




Exploragons

Exploragons:

1. Create an isosceles triangle.
2. Make it different than your partner's triangle.
3. Decide how you are going to name triangle ABC
4. Measure and record each angle. Be as precise as possible.
5. Share information w. your partner
6. Repeat for several different isosceles triangles



Sides	Angle A	Angle B	Angle C
B B G	80	80	20
P, P, Y	65	65	50
P B B	70	70	40
P P B	50	50	80
y y R	75	75	30
G G P	30	30	120
R R O	40	40	100
R R B	40	40	100
P P T	80	80	20

"def isosceles triangle"

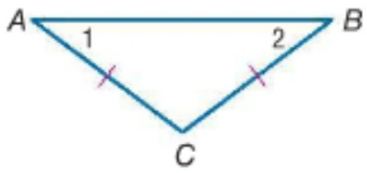
"iff"

Theorems Isosceles Triangle

4.10 Isosceles Triangle Theorem

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

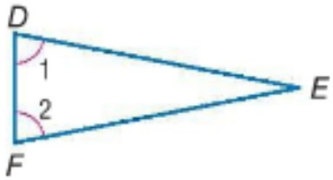
Example If $\overline{AC} \cong \overline{BC}$, then $\angle 2 \cong \angle 1$.



4.11 Converse of Isosceles Triangle Theorem

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

Example If $\angle 1 \cong \angle 2$, then $\overline{FE} \cong \overline{DE}$.



You will prove Theorem 4.11 in Exercise 37.

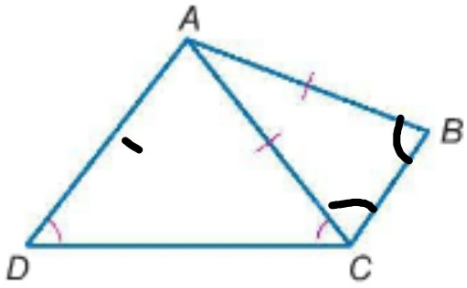
Example 1 Congruent Segments and Angles

a. Name two unmarked congruent angles.

$\angle B$ + $\angle ACB$

b. Name two unmarked congruent segments.

$\overline{AD}$ + $\overline{AC}$

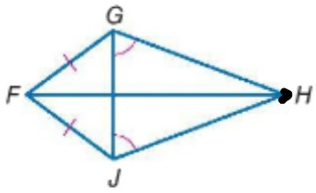


GuidedPractice ∠FGJ ∠JGJF

1A. Name two unmarked congruent angles.

1B. Name two unmarked congruent segments.

$\overline{GH}$ $\overline{JH}$

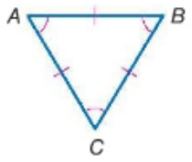


"iff: def equilateral triangle"

Corollaries Equilateral Triangle

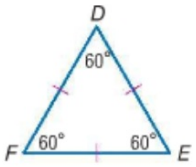
4.3 A triangle is equilateral if and only if it is equiangular.

Example If $\angle A \cong \angle B \cong \angle C$, then $\overline{AB} \cong \overline{BC} \cong \overline{CA}$.



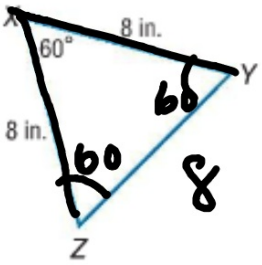
4.4 Each angle of an equilateral triangle measures 60.

Example If $\overline{DE} \cong \overline{EF} \cong \overline{FE}$, then $m\angle A = m\angle B = m\angle C = 60$.



$\frac{180}{3}$

You will prove Corollaries 4.3 and 4.4 in Exercises 35 and 36.



Example 2 Find Missing Measures

Find each measure.

a. $m\angle Y$

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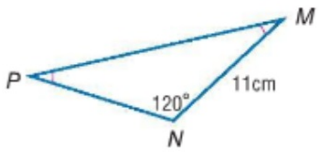
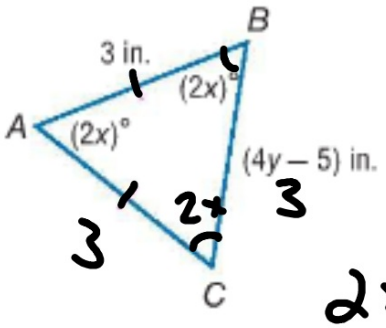
2A. $m\angle M$

2B. PN



What kind of triangle is it?



Example 3 Find Missing Values

ALGEBRA Find the value of each variable.

$2x + 2x + 2x$

$\frac{6x}{6} = \frac{180}{6}$

$x = 30$

$4y - 5 = 3$

$+5 \quad +5$

$\frac{4y}{4} = \frac{8}{4}$

$y = 2$

What kind of triangle is it?

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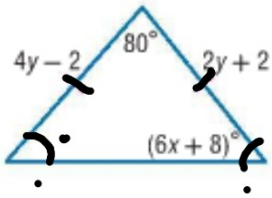
3. Find the value of each variable.



$4y-2=2y+2$

$-2y+2 \quad -2y \quad +2$

$2y=4$

$y=2$

$6x+8=90$

$-8 \quad -8$

$6x=42$

$x=7$

4.6 p289
9-23o
29-32
52-58