Wednesday, Oct. 3, 2012

No Mental Math. No TISK.

Discuss Marvelous Shot problem.

HW: p. 193 #14-19, 28-30

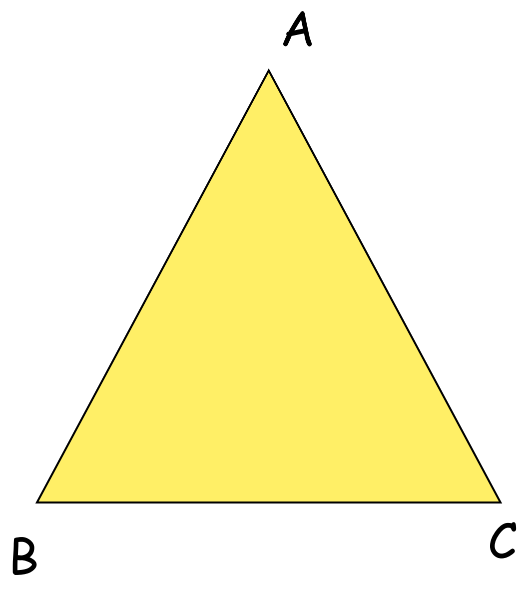
§4-2 Measures of Angles in Triangles

- Last week, we looked at triangles and tried to prove how many degrees are in the triangle.

Theorems

Triangle Sum Theorem

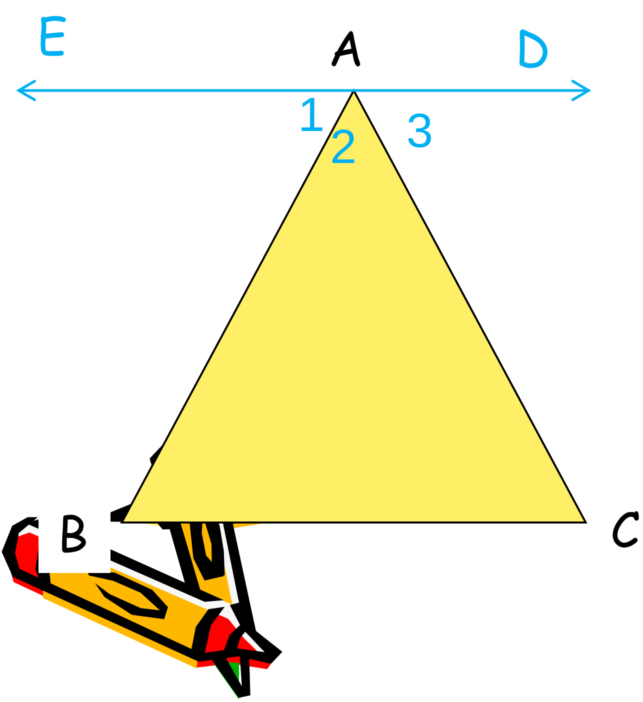
If a triangle exists, then the sum of the measures of the interior angles of the triangle is equal to 180°.



$$m\angle A + m\angle B + m\angle C = 180^\circ$$

Proof of Triangle Sum Theorem

- Given: ΔABC
- Prove: $m\measuredangle A + m\measuredangle B + m\measuredangle C = 180°$



Statement	Reason
1) ΔABC	1) Given
2) $\overleftrightarrow{AD} \parallel \overleftrightarrow{BC}$	2) Through any point not on a line, there exists exactly one line parallel to that line through that point.
3) $\measuredangle 3$& $\measuredangle C$ are AI $\measuredangle$s $\measuredangle 1$& $\measuredangle B$ are AI $\measuredangle$s	3) Assumed
4) $\measuredangle 3 \cong \measuredangle C$ & $\measuredangle 1 \cong \measuredangle B$	4)If lines $\parallel \Rightarrow$ AI $\measuredangle$s are $\cong$
5) $m\measuredangle 3 = m\measuredangle C$ & $m\measuredangle 1 = m\measuredangle B$	5)If $\measuredangle$s are $\cong \Rightarrow$ measures =
6) $m\measuredangle 1 + m\measuredangle 2 + m\measuredangle 3 = m\measuredangle DAE$	6) $\measuredangle$ Add Post.
7) $\measuredangle DAE$ is a straight angle	7) assumed
8) $\mathrm{m}\measuredangle DAE = 180°$	8) If $\measuredangle$ is straight $\Rightarrow$ measure = 180°
9) $m\measuredangle 1 + m\measuredangle 2 + m\measuredangle 3 = 180°$ $m\measuredangle \mathrm{B} + m\measuredangle \mathrm{A} + m\measuredangle \mathrm{C} = 180°$	9) If *a* = *b* then *a* can sub for b in any equation
10) $m\measuredangle \mathrm{A} + m\measuredangle \mathrm{B} + m\measuredangle \mathrm{C} = 180°$	10) Commutative Prop. of +

Now that we know that…

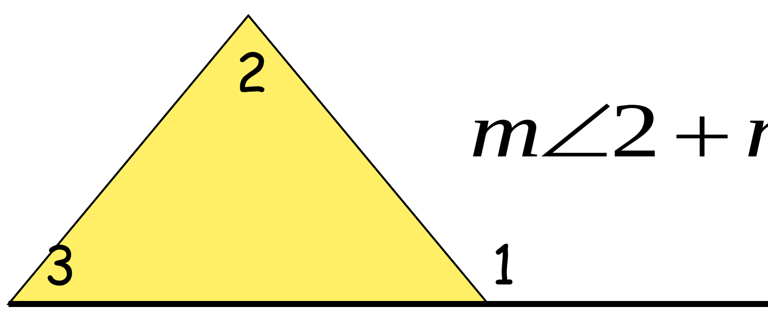
- Let's look back at some of the classifications by angles…
  - Acute Triangle
  - Equiangular Triangle
  - Right Triangle
  - Obtuse Triangle

Can a triangle be both… and…?

Theorems

Exterior Angle Theorem

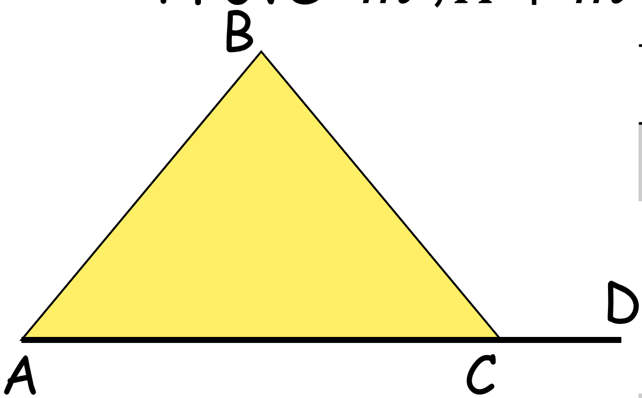
If a triangle exists, then the measure of an exterior angle of the triangle is equal to the sum of the measures of the two nonadjacent interior angles.



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

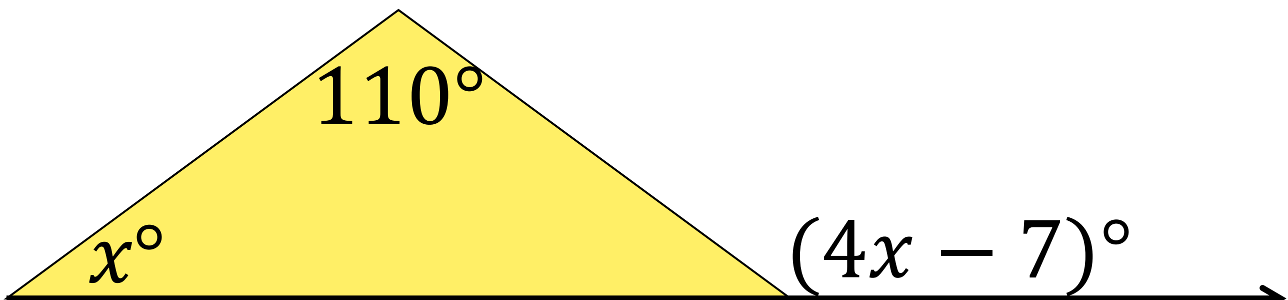
Proof of Exterior Angle Theorem

- Given: ΔABC
- Prove: $m\measuredangle A + m\measuredangle B = m\measuredangle BCD$



Statement	Reason
1) ΔABC	1) Given
2) $m\measuredangle A + m\measuredangle B + m\measuredangle ACB = 180$	2) Triangle Sum Theorem
3) $\measuredangle ACB$ & $\measuredangle BCD$ are a l.p.	3) Assumed
4) $m\measuredangle ACB + m\measuredangle BCD = 180$	4) L.P. Postulate
5) $m\measuredangle ACB + m\measuredangle BCD = m\measuredangle A + m\measuredangle B + m\measuredangle ACB$	5) Substitution Prop of =
6) $m\measuredangle BCD = m\measuredangle A + m\measuredangle B$	6) Subtraction Prop of =
7) $m\measuredangle A + m\measuredangle B = m\measuredangle BCD$	7) Symmetric Prop of =

Find the value of x. Then find the measure of the exterior angle.



Using the Exterior Angle theorem, we know that

$$(4x-7)° = x + 110°$$

So, we solve the equation!

$$\begin{aligned} 3x - 7 &= 110 \\ 3x &= 117 \\ x &= 39 \end{aligned}$$

$$x = 39$$

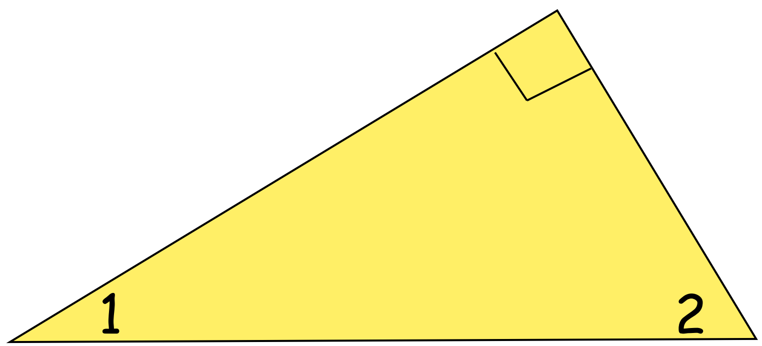
$$\begin{aligned} (4x-7)° &= 4(39) - 7 \\ &= 156 - 7 \\ &= 149° \end{aligned}$$

A corollary is a statement that can be easily proven using a theorem.

Theorems

Corollary to the Triangle Sum Theorem

The acute angles of a right triangle are complementary.

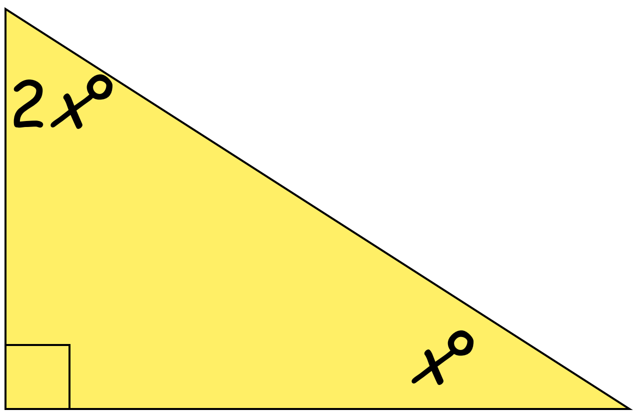


$$m\angle 1 + m\angle 2 = 90^\circ$$

Proof of the Corollary

- You will have to prove the corollary on a quiz.

Find the measures of the unknown angles.



Using the Corollary to the Triangle Sum Theorem, we know that

$$2x + x = 90^\circ$$

So, we solve the equation!

$$3x = 90$$

$$x = 30$$

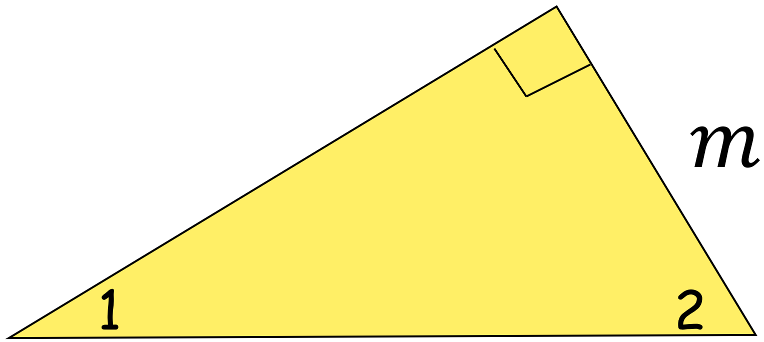
$$x = 30$$

$$2x^\circ = 2(30) = 60^\circ$$

$$x^\circ = 30^\circ$$

Find the measures of the unknown angles.

- The measure of one acute angle of a right triangle is one-fourth the measure of the other acute angle.



$$m\measuredangle 1 = \frac{1}{4} m\measuredangle 2$$

Using the Corollary to the Triangle Sum Theorem, we know that

$$m\measuredangle 1 + m\measuredangle 2 = 90$$

$$\frac{1}{4} m\measuredangle 2 + m\measuredangle 2 = 90$$

$$\frac{5}{4} m\measuredangle 2 = 90$$

$$m\measuredangle 2 = 72$$

$$m\measuredangle 1 = 18$$

Homework

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