

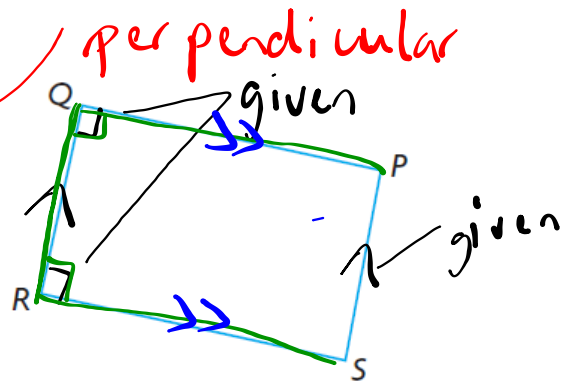
Homework... Questions

p. 78: #2, 8, 10, 12, 20

10. Jason wrote the following proof.
Identify his errors, and correct his proof.

Given: $QP \perp QR$
 $QR \perp RS$
 $QR \parallel PS$

Prove: $QPSR$ is a parallelogram.



Jason's Proof

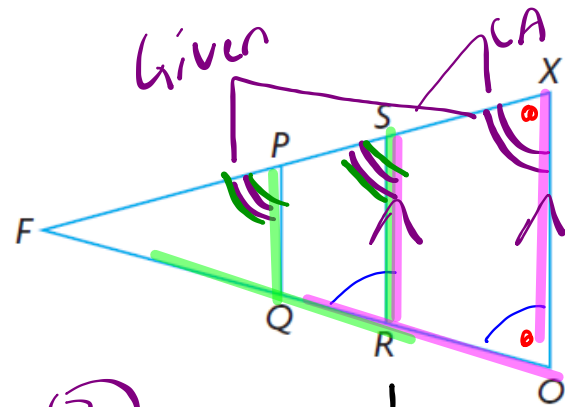
Statement	Justification
$\angle PQR = 90^\circ$ and $\angle QRS = 90^\circ$	Lines that are perpendicular meet at right angles. ✓
$QP \parallel RS$	Since the interior angles on the same side of a transversal are equal, QP and RS are parallel. <i>supplementary</i>
$QR \parallel PS$	Given ✓
$QPSR$ is a parallelogram	$QPSR$ has two pairs of parallel sides. ✓

12. Given: $\triangle FOX$ is isosceles.

$$\angle FOX = \angle FRS$$

$$\angle FXO = \angle FPQ$$

Prove: $PQ \parallel SR$ and $SR \parallel XO$



①

Statement	Justification
$\angle FOX = \angle FRS$	Given
$\therefore SR \parallel XO$	CA

②

S	J
$\angle FPQ = \angle FSR$	Given
$\angle FSR = \angle FXO$	CA
$\angle FPQ = \angle FXO$	Transitive
$\therefore PQ \parallel SR$	CA

2.3

Angle Properties in Triangles

GOAL

Prove properties of angles in triangles, and use these properties to solve problems.

Construct a triangle with paper...

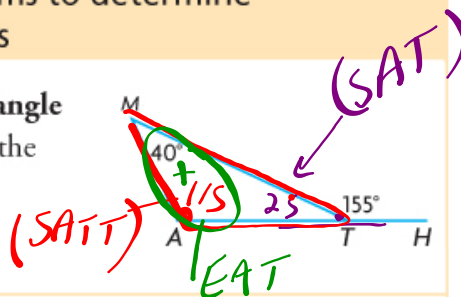
- tear off the angles and line them up!

CONJECTURE

APPLY the Math

EXAMPLE 1 Using angle sums to determine angle measures

In the diagram, $\angle MTH$ is an **exterior angle** of $\triangle MAT$. Determine the measures of the unknown angles in $\triangle MAT$.



$\angle MTA = 25^\circ$
 $\angle MAT = 115^\circ$

Serge's Solution

$$\begin{aligned} \angle MTA + \angle MTH &= 180^\circ \\ \angle MTA + (155^\circ) &= 180^\circ \\ \angle MTA &= 25^\circ \end{aligned}$$

$\angle MTA$ and $\angle MTH$ are supplementary since they form a straight line.

$$\begin{aligned} \angle MAT + \angle AMT + \angle MTA &= 180^\circ \\ \angle MAT + (40^\circ) + (25^\circ) &= 180^\circ \\ \angle MAT &= 115^\circ \end{aligned}$$

The sum of the measures of the interior angles of any triangle is 180° .

The measures of the unknown angles are:
 $\angle MTA = 25^\circ$; $\angle MAT = 115^\circ$.

EXAMPLE 2 Using reasoning to determine the relationship between the exterior and interior angles of a triangle

Determine the relationship between an exterior angle of a triangle and its **non-adjacent interior angles**.

Joanna's Solution



I drew a diagram of a triangle with one exterior angle. I labelled the angle measures a , b , c , and d .

$$\begin{aligned} \angle d + \angle c &= 180^\circ \\ \angle d &= 180^\circ - \angle c \end{aligned}$$

$\angle d$ and $\angle c$ are supplementary. I rearranged these angles to isolate $\angle d$.

$$\begin{aligned} \angle a + \angle b + \angle c &= 180^\circ \\ \angle a + \angle b &= 180^\circ - \angle c \end{aligned}$$

The sum of the measures of the angles in any triangle is 180° .

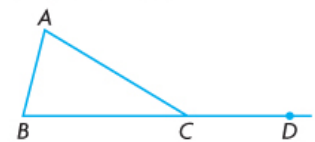
$$\angle d = \angle a + \angle b$$

Since $\angle d$ and $(\angle a + \angle b)$ are both equal to $180^\circ - \angle c$, by the transitive property, they must be equal to each other.

The measure of an exterior angle of a triangle is equal to the sum of the measures of the two non-adjacent interior angles.

non-adjacent interior angles

The two angles of a triangle that do not have the same vertex as an exterior angle.

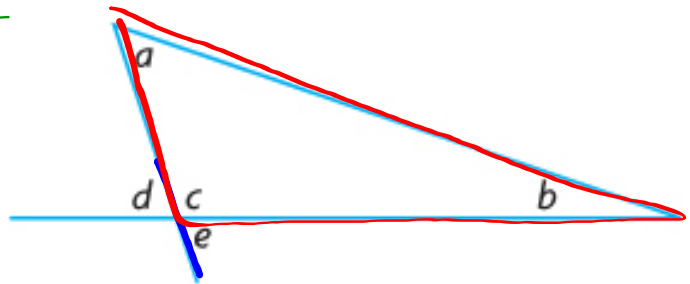


$\angle A$ and $\angle B$ are non-adjacent interior angles to exterior $\angle ACD$.



Your Turn Prove EAT

Prove: $\angle e = \angle a + \angle b$



Answer



Statement	Justification
$\angle c + \angle e = 180^\circ$	SAT
$\angle a + \angle b + \angle c = 180^\circ$	SAT T
$\angle a + \angle b + \cancel{\angle c} = \cancel{\angle c} + \angle e$	Transitive
$\angle a + \angle b = \angle e$	Grouping

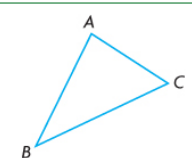
In Summary

Key Idea

- You can prove properties of angles in triangles using other properties that have already been proven.

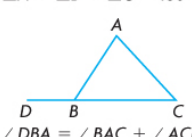
Need to Know

- In any triangle, the sum of the measures of the interior angles is proven to be 180° .



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

- The measure of any exterior angle of a triangle is proven to be equal to the sum of the measures of the two non-adjacent interior angles.



$$\angle DBA = \angle BAC + \angle ACB$$

p. 90

HW... Section 2.3: #1 - 13

Attachments

PM11-2s3-2.gsp

2s3e2 finalt.mp4