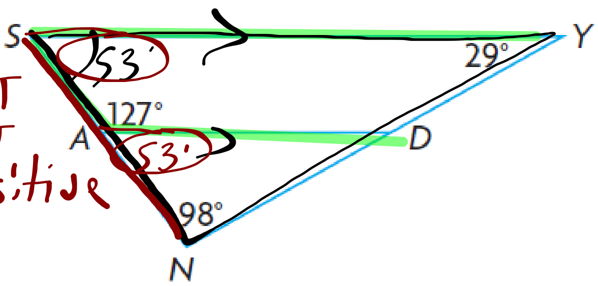
HW... Section 2.3: #1 - 13

Questions 7, 8, 10, 13
p. 90

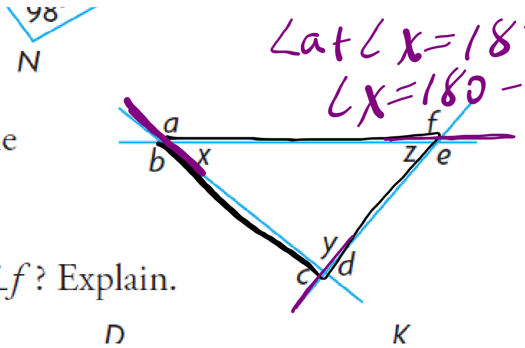
7. Prove: $SY \parallel AD$

S	J
∠ASY = 53°	SATT
∠DAN = 53°	SAT
∠ASY = ∠DAN	Transitive
∴ SY ∥ AD	CA

or



Statement	Justification
∠ASY = 53°	SATT
∠SAD = 127°	Given
∠ASY + ∠SAD = 180°	Addition
∴ SY ∥ AD	C∓A



$\angle a + \angle x = 180$
$\angle x = 180 - \angle a$

8. Each vertex of a triangle has two exterior angles, as shown.

a) Make a conjecture about the sum of the measures of $\angle a$, $\angle c$, and $\angle e$.

b) Does your conjecture also apply to the sum of the measures of $\angle b$, $\angle d$, and $\angle f$? Explain.

c) Prove or disprove your conjecture.

a) Add to 360°

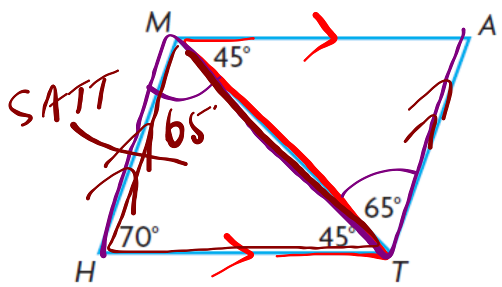
b) Yes . . . OAT

*c)

S	J
$\angle x + \angle y + \angle z = 180°$	SATT
$(180 - \angle a) + (180 - \angle c) + (180 - \angle e) = \cancel{180}$	Rearrange
$360 = \angle a + \angle c + \angle e$	

10. Prove that quadrilateral *MATH* is a parallelogram.

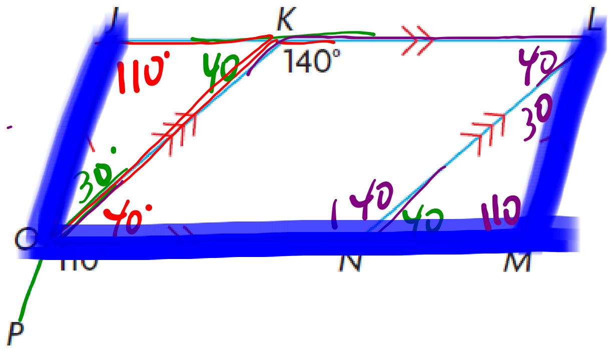
S	J
$\angle AMT = \angle HTM$	Given
$\therefore MA \parallel TH$	AIA



S	J
$\angle MTA = 65°$	Given
$\angle HMT = 65°$	SATT
$\angle MTA = \angle HMT$	Transitive
$\therefore MH \parallel TA$	AIA

13. Use the given information to determine the measures of $\angle J$, $\angle JKO$, $\angle JOK$, $\angle KLM$, $\angle KLN$, $\angle M$, $\angle LNO$, $\angle LNM$, $\angle MLN$, $\angle NOK$, and $\angle JON$.

110 40 30 70
40 110 140 40
30 40 70



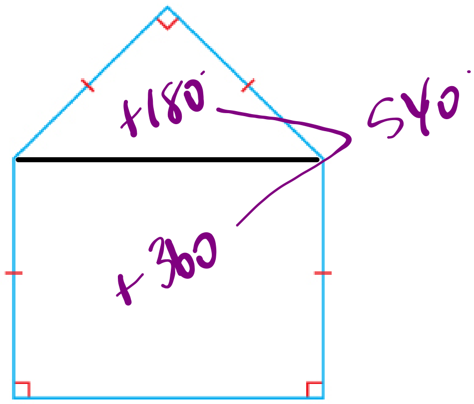
2.4 Angle Properties in Polygons

GOAL

Determine properties of angles in polygons, and use these properties to solve problems.

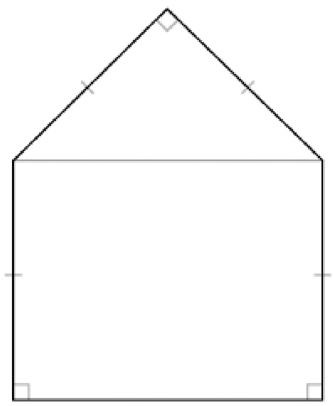
EXPLORE...

• A pentagon has three right angles and four sides of equal length, as shown. What is the sum of the measures of the angles in the pentagon?



SAMPLE ANSWER

I drew a diagonal joining the two angles that are not right angles. This cut the pentagon into a rectangle and a triangle. I knew that the quadrilateral was a rectangle, not a trapezoid, because the two right angles share an arm, so their other arms must be parallel. As well, the other arms are equal length. I knew that the sum of the measures of the angles in a rectangle is 360° and the sum of the measures of the angles in a triangle is 180°, so the sum of the measures of the angles in the pentagon must be 540°.

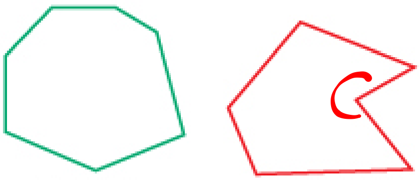


Function Notation

$F(x)$

convex polygon

A polygon in which each interior angle measures less than 180°.



convex non-convex (concave)

$S(6) = 180(6-2)$
$= 720°$

$S(5) = 180(5-2)$
$= 540°$

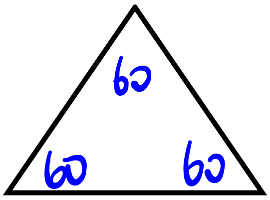
This is my conjecture: The sum of the measures of the interior angles in a polygon, $S(n)$, is:

$S(n) = 180°(n - 2)$

$S = 180(n-2)$

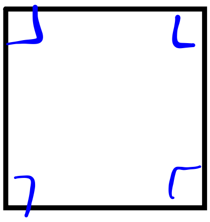
Sum # of sides

Regular Polygon → all angles / sides are equal

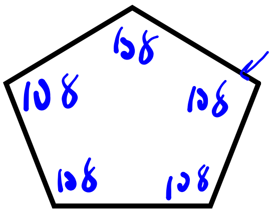


Equilateral

Triangle



Square

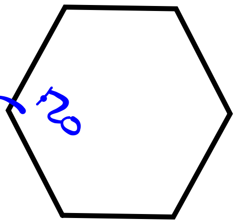


$\frac{540}{5}$

Pentagon

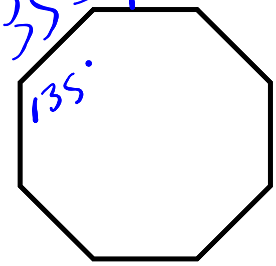
11 sided

$\frac{720}{6}$



Hexagon

$135 = 90 + 45$



Octagon

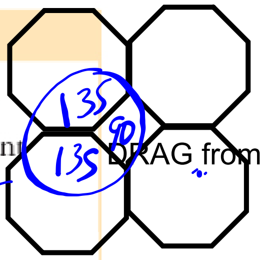
Undecagon

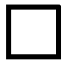
[11 sided]

Tiling Using Regular Polygons...

Regular Polygon	Measure of Interior Angle (degrees)
Equilateral Triangle	60
Square	90
Pentagon	108
Hexagon	120
Heptagon (7 sided)	128.3
Octagon	135
Nonagon (9 sided)	140
Decagon (10 sided)	144

EXAMPLE 3 Visualizing tessellations





DRAG from above shapes

A floor tiler designs custom floors using tiles in the shape of regular polygons. Can the tiler use congruent regular octagons and congruent squares to tile a floor, if they have the same side length?

Add 360°

Vanessa's Solution

$S(n) = 180°(n - 2)$
$S(8) = 180°[(8) - 2]$
$S(8) = 1080°$
$\frac{1080°}{8} = 135°$

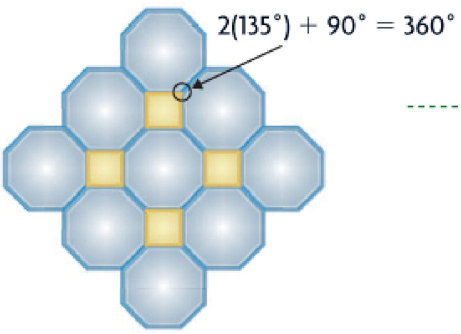
The measure of each interior angle in a regular octagon is 135°.
The measure of each internal angle in a square is 90°.

> Since an octagon has eight sides, $n = 8$.

> First, I determined the sum of the measures of the interior angles of an octagon. Then I determined the measure of each interior angle in a regular octagon.

Two octagons fit together, forming an angle that measures:
$2(135°) = 270°$.
This leaves a gap of 90°.
$2(135°) + 90° = 360°$
A square can fit in this gap if the sides of the square are the same length as the sides of the octagon.

> I knew that three octagons would not fit together, as the sum of the angles would be greater than 360°.



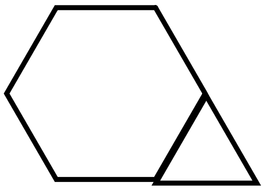
> I drew what I had visualized using dynamic geometry software.

The tiler can tile a floor using regular octagons and squares when the polygons have the same side length.

Your Turn

Can a tiling pattern be created using regular hexagons and equilateral triangles that have the same side length? Explain.

Answer



HOMEWORK...

Page 99: 1, 3, 4, 5, 10, 11, 16

HISTORY on Buckyball Do A, B and C

Attachments

2s4e3 finalt.mp4