


Angles and Polygons

MA 341 - Topics in Geometry
Lecture 06



Theorem

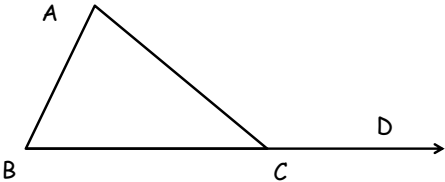
The sum of the interior angles in a triangle is 180° .

Proof:

06-Sept-2011 MA 341 001 2

Exterior Angles

In triangle $\triangle ABC$ extend BC to a point D on the line. Then $\angle ACD$ is called an exterior angle of the triangle.



06-Sept-2011 MA 341 001 3

Exterior Angles

How many exterior angles does a triangle have?

$\angle ACD \cong \angle BCE$
 $\angle CAJ \cong \angle BAH$
 $\angle ABG \cong \angle CBF$
 $\angle DCE ?$

06-Sept-2011 MA 341 001 4

Exterior Angle

$\angle ACD$ is an exterior angle and $\angle A$ and $\angle B$ are called remote interior angles.

06-Sept-2011 MA 341 001 5

Theorem

An exterior angle of a triangle equals the sum of the two remote interior angles.

Proof:

06-Sept-2011 MA 341 001 6

Question

What is the sum of the exterior angles in a triangle, one at each vertex? Why?

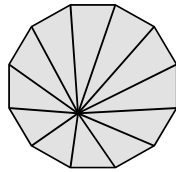
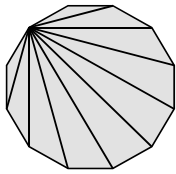
Proof:

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7

Convex Polygons










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8

Sums of Interior Angles

| Figure | Sides | Vertices | Sum |
|---|-------|----------|-----|
|  | 3 | 3 | 180 |
|  | 4 | 4 | |
|  | 5 | 5 | |
|  | 6 | 6 | |
|  | 7 | 7 | |
|  | 8 | 8 | |
|  | 9 | 9 | |

06-Sept-2011

MA 341 001

9

Exterior Angles

06-Sept-2011 MA 341 001 10

Convex Polygons

What is the sum of the exterior angles of a convex polygon?

Is this true for non-convex polygons?

06-Sept-2011 MA 341 001 11

Non-convex Polygons

06-Sept-2011 MA 341 001 12
