Regular Polygons

Geometry

Chapter 3

A BowerPoint Presentation

Regular polygon

A regular polygon is

– Equilateral (all sides are $\cong$)

AND

– Equilateral (all angles are $\cong$)

Regular polygon

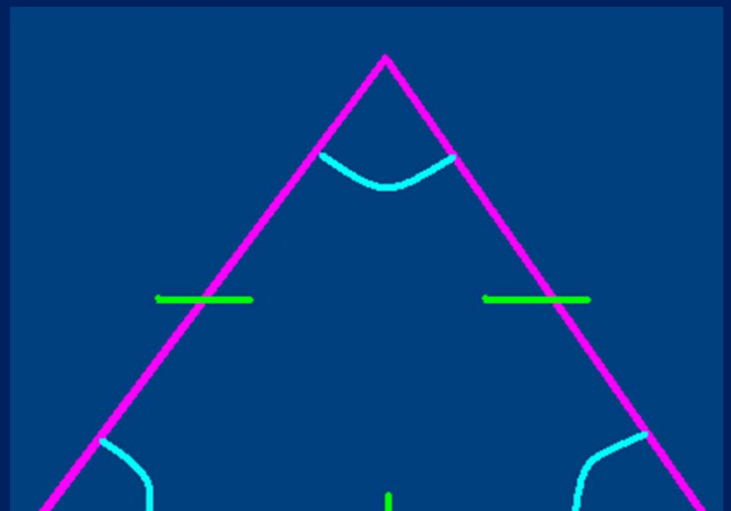
A regular polygon is

– Equilateral (all sides are $\cong$)

AND

– Equiangular (all angles are $\cong$)

A regular triangle



Regular polygon

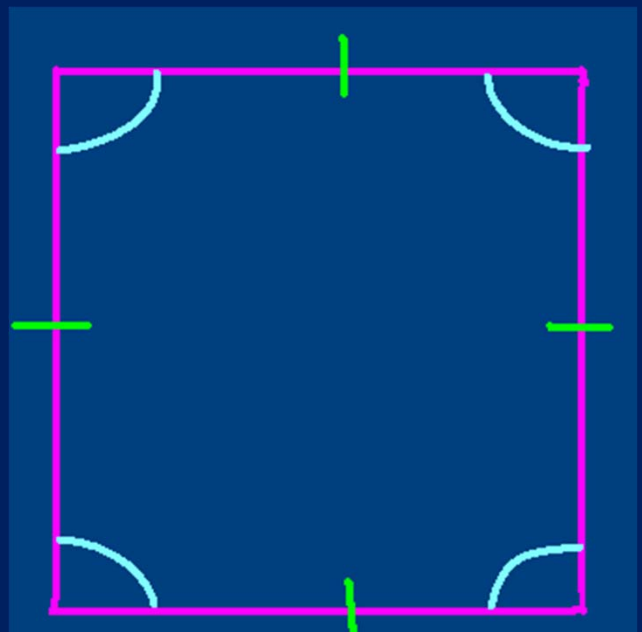
A regular polygon is

– Equilateral (all sides are $\cong$)

AND

– Equilateral (all angles are $\cong$)

A regular quadrilateral
(also known as a **square**)



Regular polygon

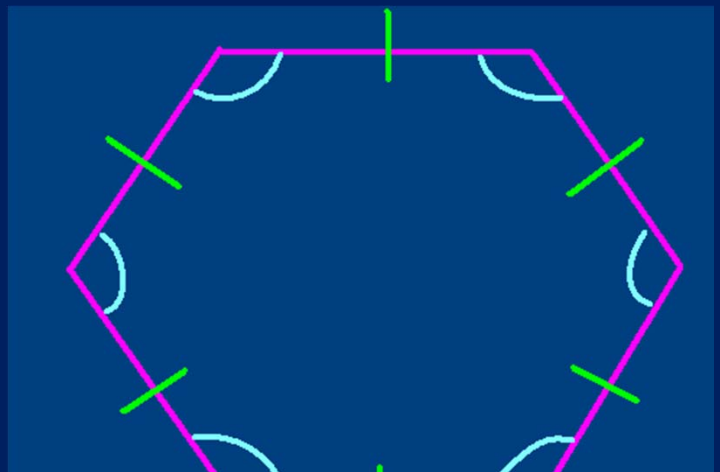
A regular polygon is

– Equilateral (all sides are $\cong$)

AND

– Equilateral (all angles are $\cong$)

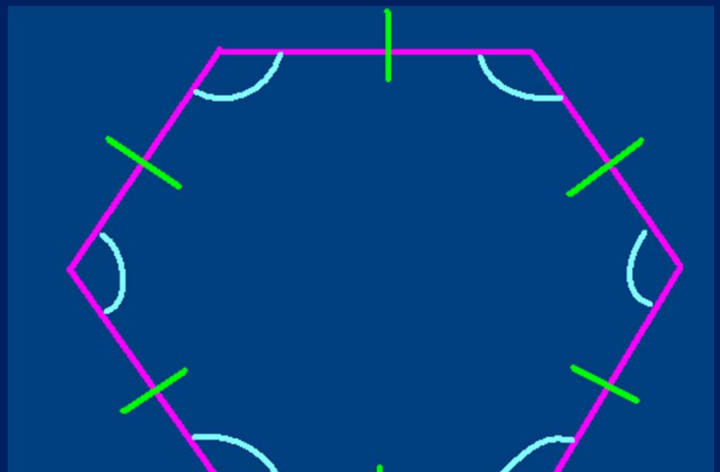
A regular hexagon



nterior angles of regular polygons

What is the measure of each interior angle of this regular hexagon?

There are
six congruent sides &
six congruent angles

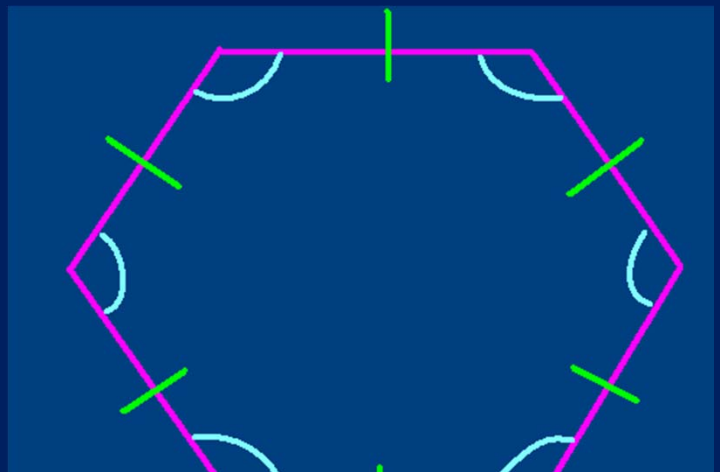


nterior angles of regular polygons

What is the measure of each interior angle of this regular hexagon?

Do you remember
(n – 2) 180 ?

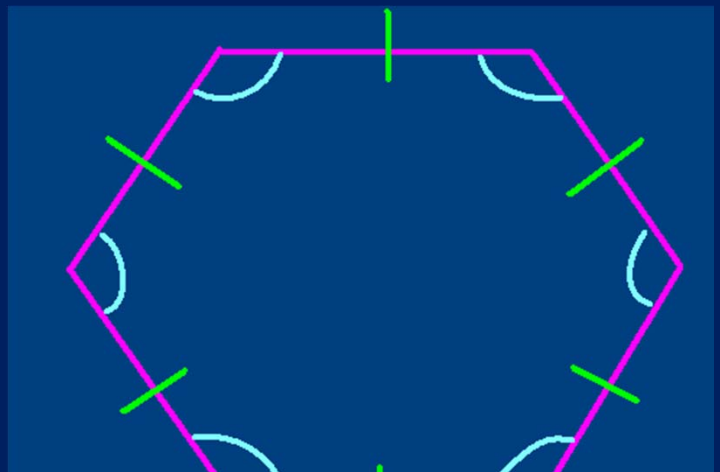
[n is the # of sides]



nterior angles of regular polygons

What is the measure of each interior angle of this regular hexagon?

$(6 - 2)\ 180 =$
$(4)\ 180 =$
720° is the sum for int ∠s

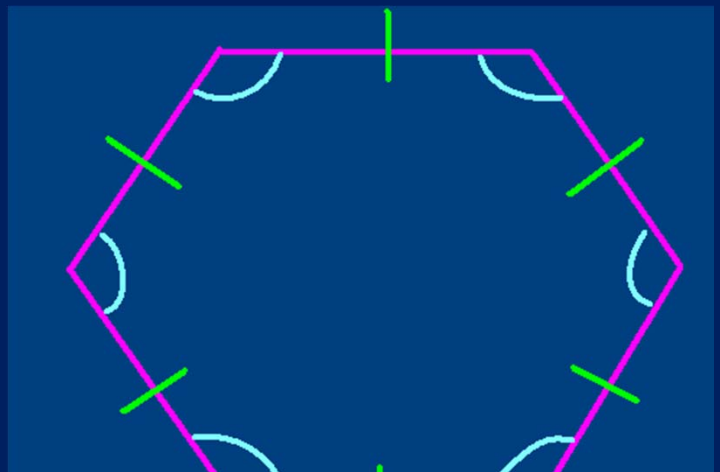


nterior angles of regular polygons

What is the measure of each interior angle of this regular hexagon?

120°

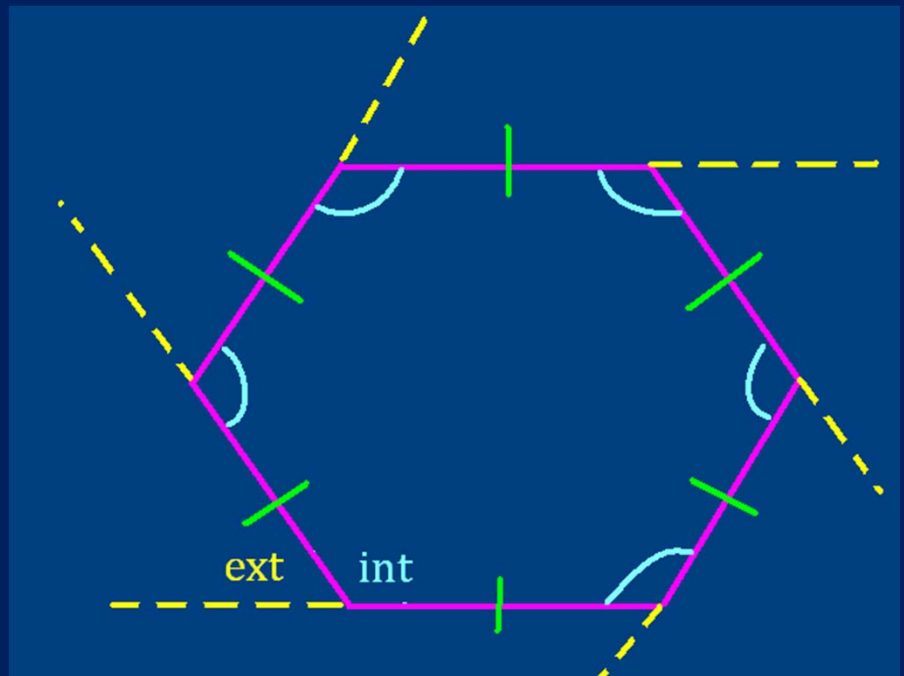
All interior ∠s are equal, so
720° / 6 = 120°



Exterior angles of regular polygons

What is the measure of each exterior angle of this regular hexagon?

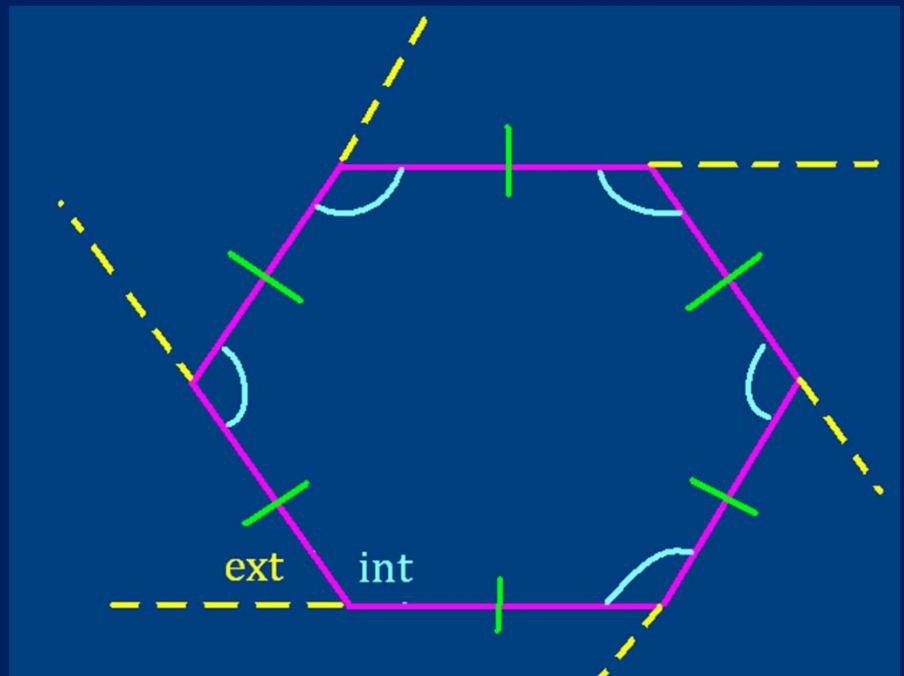
Do you remember what the sum of the exterior ∡s of ANY convex polygon must = ?



Exterior angles of regular polygons

What is the measure of each exterior angle of this regular hexagon?

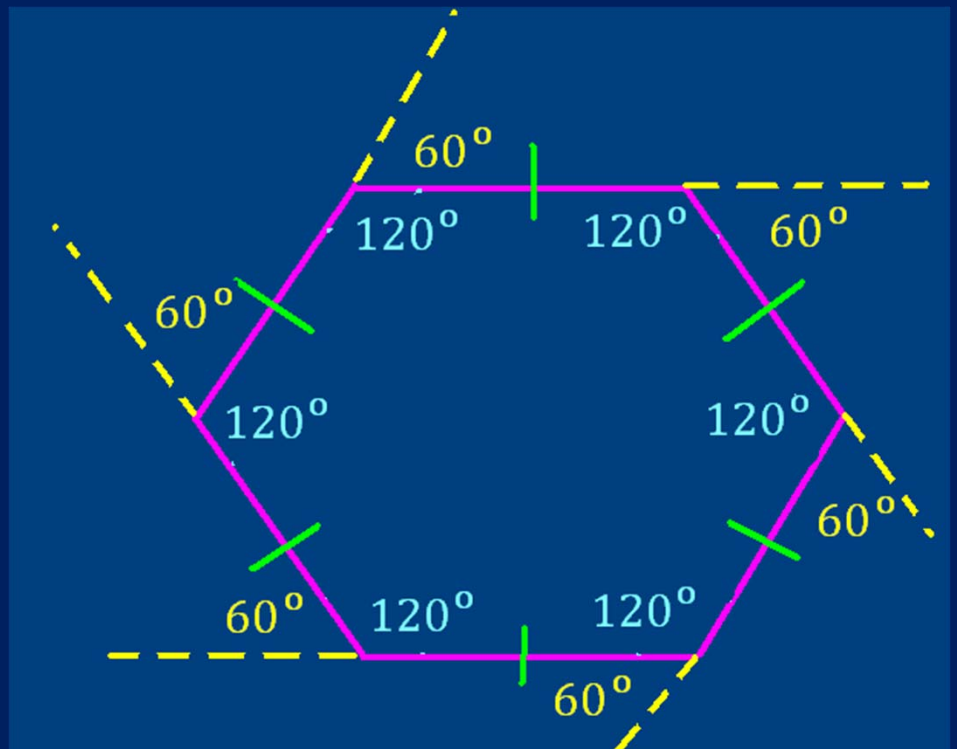
The sum of the exterior ∡s of ANY convex polygon must = 360° !



Exterior angles of regular polygons

What is the measure of each exterior angle of this regular hexagon?

60°

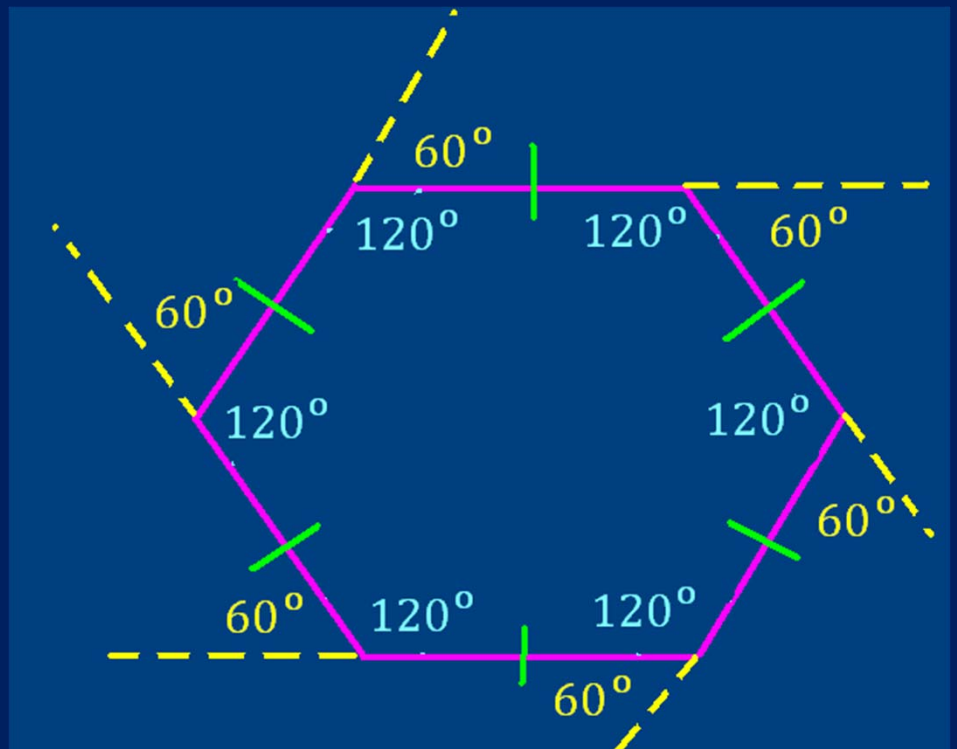


All the exterior ∡ s are equal, so
360° / 6 = 60° !

Interior ∠ + Exterior ∠ = 180°

Notice that at each vertex,

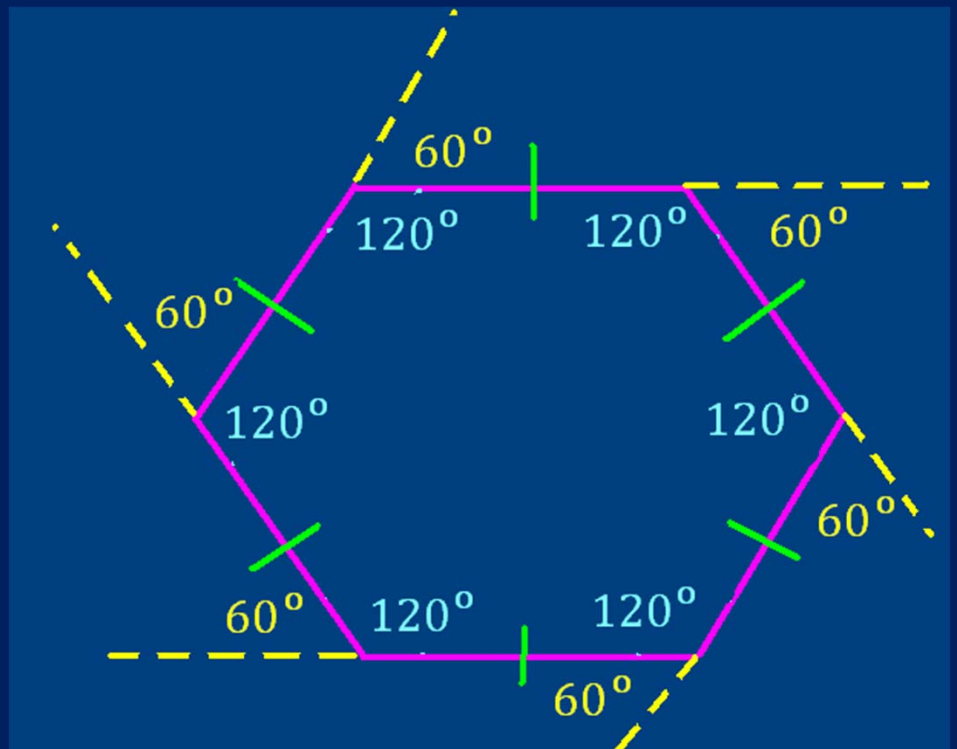
the interior ∠ + the exterior ∠ = 180°



Interior ∡ + Exterior ∡ = 180°

Notice that at each vertex,
the interior ∡ + the exterior ∡ = 180°

r regular polygons…
you know either the
terior ∡ or the
terior ∡ , it is easy
find the other one!
ow?)



A BowerPowerful TIP

When you are working on regular polygon problems, your BEST FRIEND is the…

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EXTERIOR $\measuredangle$

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EXTERIOR $\measuredangle$

We know all the exterior angles of a regular polygon are equal

A BowerPowerful TIP

When you are working on regular polygon problems, your BEST FRIEND is the…

EXTERIOR $\measuredangle$

We know all the exterior angles of a regular polygon are equal, and

We know all the exterior angles of a regular polygon have a sum of 360°

Example #1- You know the exterior ∡

ach exterior angle of a certain regular polygon has a measure of 10°.

- How many sides does this regular polygon have?
- What is the measure of each interior ∡ ?

Example #1- You know the exterior ∡

ach exterior angle of a certain regular polygon has a measure of 10°.

- How many sides does this regular polygon have?
- What is the measure of each interior ∡ ?

e are in great shape, because we know each exterior ∡ = 10° !

Example #1- You know the exterior ∡

Each exterior angle of a certain regular polygon has a measure of 10°.

How many sides does this regular polygon have?

Let's start with the # of sides (which is the same as the # of angles)

360° / 10 = **36 sides**

Example #1- You know the exterior ∡

ach exterior angle of a certain regular
polygon has a measure of 10°.
What is the measure of each interior ∡ ?

/e know exterior ∡ + interior ∡ = 180°

10° + interior ∡ = 180°

each interior ∡ = 170°

YOU TRY- You know the exterior ∡

ach exterior angle of a certain regular polygon has a measure of 20°.

- How many sides does this regular polygon have?
- What is the measure of each interior ∡ ?

YOU TRY- You know the exterior ∡

ach exterior angle of a certain regular polygon has a measure of 20°.

How many sides does this regular polygon have? **18 sides**

What is the measure of each interior ∡ ?

160°

Example #2- You DON'T know the exterior ∠

ach interior angle of a certain regular polygon has a measure of 179°.

How many sides does this regular polygon have?

What is the measure of each exterior ∠ ?

Example #2- You DON'T know the exterior ∠

ach interior angle of a certain regular polygon has a measure of 179°.

- How many sides does this regular polygon have?
- What is the measure of each exterior ∠ ?

ur best friend is the exterior ∠ - let's find it first!

Example #2- You DON'T know the exterior ∡

ach interior angle of a certain regular polygon has a measure of 179°.

What is the measure of each exterior ∡ ?

exterior ∡ + interior ∡ = 180°

exterior ∡ + 179° = 180°

exterior ∡ = 1°

Example #2- You DON'T know the exterior ∡

ach interior angle of a certain regular polygon has a measure of 179°.

How many sides does this regular polygon have?

/e can use exterior ∡ = 1° to help us find the number of sides.

Example #2- You DON'T know the exterior ∡

ach interior angle of a certain regular polygon has a measure of 179°.

How many sides does this regular polygon have?

Since each exterior ∡ = 1° ,

360° / 1 = **360 sides**

YOU TRY- You DON'T know the exterior ∡

certain regular polygon has 10 sides.

What is the measure of each interior ∡ ?

What is the measure of each exterior ∡ ?

[Remember which ∡ is your best friend!!!]

YOU TRY- You DON'T know the exterior ∡

certain regular polygon has 10 sides.

What is the measure of each interior ∡ ?

144°

What is the measure of each exterior ∡ ?

36°

[Did you find the exterior ∡ first?]

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