Goals Part 2 For Today Circle Properties

- Identify Segments/Lines in/on a Circle

- Learn properties about angles formed from segments/lines in/on a circle.

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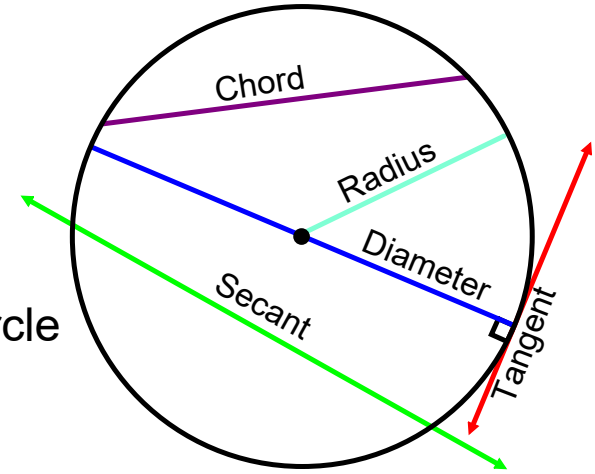
Refresh of some definitions from yesterday

Circle Properties

Chord - A line that links two points on a circle

Secant - A line that intersects a circle at two points

Tangent - A line that contacts a circle at only one point. Perpendicular to radius.



Circle Properties

Let's look at how these lines and segments can intersect to form angles and arcs.

On the Circle

Inscribed Angles

Chord - Tangent

Inscribed Quadrilaterals

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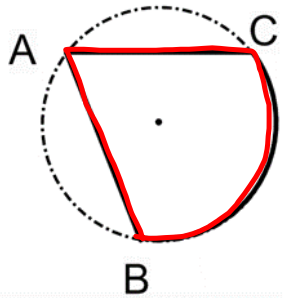
Circle Properties

On the Circle

Inscribed Angles



How does $m\angle A$ relate to $m\overset{\frown}{CB}$?

$2(m\angle A) = m\overset{\frown}{CB}$

so

2(angle) = arc

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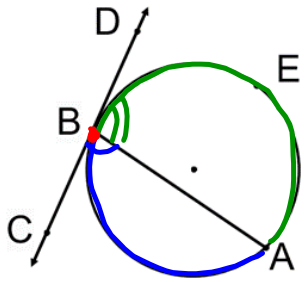
Circle Properties

On the Circle

Chord - Tangent



Vertex ON circle

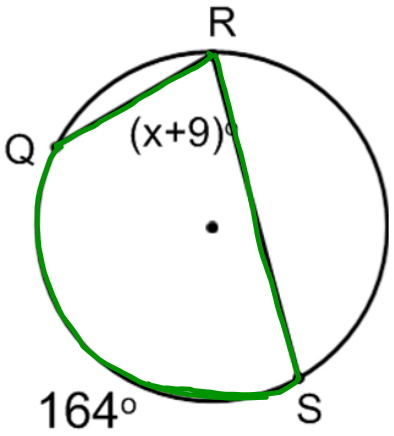
How does m∠ABC relate to $m\overset{\frown}{AB}$
and m∠ABD relate to $m\overset{\frown}{BEA}$?

$2(m\angle ABC) = m\overset{\frown}{AB}$

$2(m\angle ABD) = m\overset{\frown}{BEA}$

} 2(angle) = arc

Ex.1: Solve for x



Vertex ON:

$2(\angle) = \text{arc}$

(∠ = angle)

$2(x+9)=164$

$2x+18=164$

$2x=146$

$x=73$

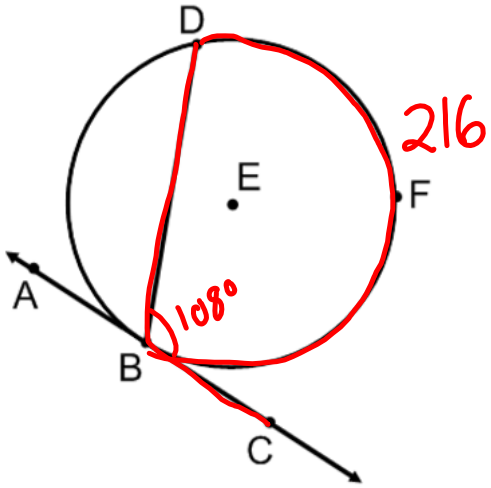
Ex.2: If $m\angle DBC = 108^o$, what is $m\overset{\frown}{BFD}$?

GN

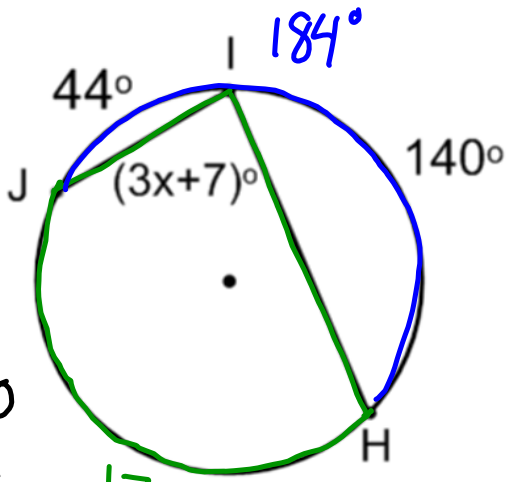
$2(\angle) = arc$

$2(108) = m\overset{\frown}{BFD}$

$216 = m\overset{\frown}{BFD}$



Ex.3: Find the value of x.



$184 + m\overset{\frown}{JH} = 360$

$m\overset{\frown}{JH} = 176$

ON:

$2(\angle) = arc$

$2(3x+7) = 176$

$6x + 14 = 176$

$6x = 162$

$x = 27$

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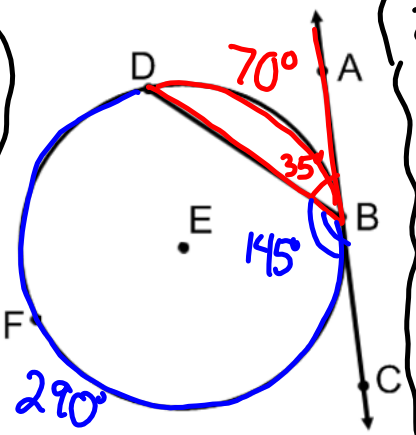
Ex 4: If $m\angle DBA = 35^o$, what is $m\overset{\frown}{BFD}$?



1st Method

ON: 2 (∠) = arc

2(35) = $m\overset{\frown}{DB}$

70 = $m\overset{\frown}{DB}$

$m\overset{\frown}{BFD}$ + 70 = 360

$m\overset{\frown}{BFD}$ = 290°

2nd Method

$m\angle DBA + m\angle DBC = 180$

$35 + m\angle DBC = 180$

$m\angle DBC = 145°$

ON: 2(∠) = arc

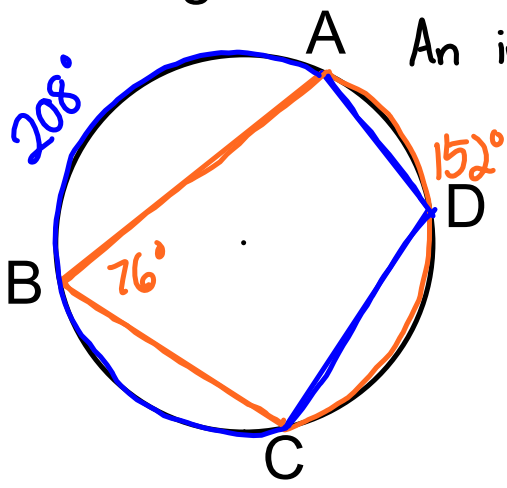
2 (145) = $m\overset{\frown}{BFD}$

290° = $m\overset{\frown}{BFD}$

You Try

Problems 1, 3, 5, 6

What if you made two connected inscribed angles? What type of shape is made?



An inscribed quadrilateral

If $m\angle B = 76°$ what is the $m\overset{\frown}{AC}$?

ON: $2(\angle) = arc$

$2(76) = m\overset{\frown}{AC}$

$152° = m\overset{\frown}{AC}$

What would the $m\overset{\frown}{ABC}$ be?

$152° + m\overset{\frown}{ABC} = 360$

$m\overset{\frown}{ABC} = 208°$

What would the $m\angle D$ be?

ON: $2(\angle) = arc$

$2(m\angle D) = 208°$

$m\angle D = 104°$

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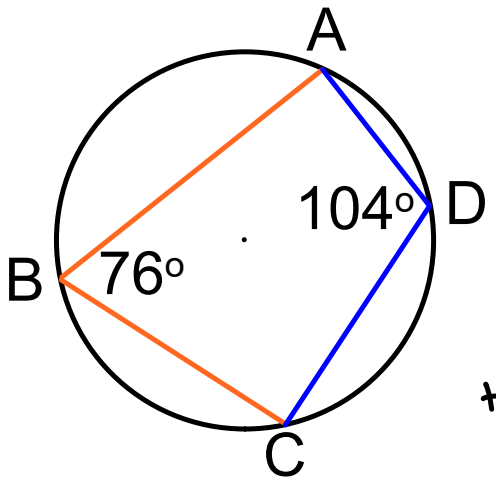

What would m∠B + m∠D be?

$76° + 104° = 180°$

Would the same be true for m∠A + m∠C? Yes, because the angles form arcs that together make the circle (360°) and the angles are half the arc (180°)

What does this show?

Opposite angles of an inscribed quadrilateral are supplementary

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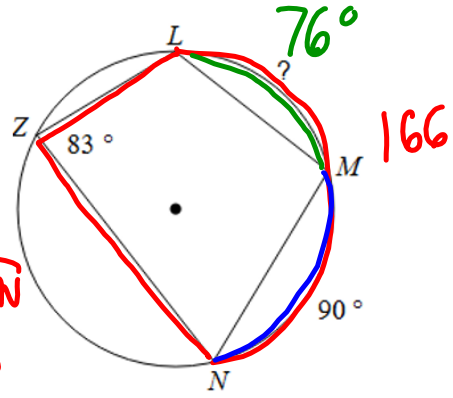
Ex.2: Solve for the value of '?'



ON: $2(\angle) = \text{arc}$

$2(83) = m\overset{\frown}{LN}$

$166^\circ = m\overset{\frown}{LN}$

$m\overset{\frown}{NM} + m\overset{\frown}{ML} = m\overset{\frown}{LN}$

$90 + m\overset{\frown}{ML} = 166$

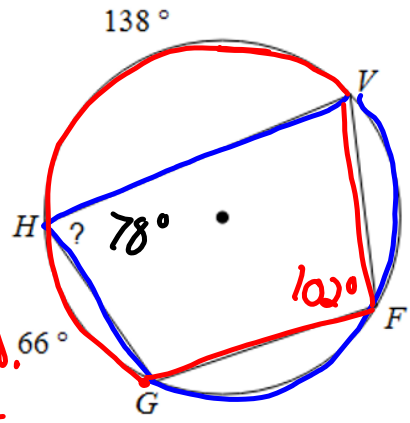
$\boxed{m\overset{\frown}{ML} = 76^\circ}$

76°

166

ON:

Ex.3: Solve for the value of '?'



$2(\angle) = \text{arc}$

- Don't Know $m\angle H$ or $m\overset{\frown}{VG}$
- Need to find other $\angle$'s & arcs

$2(F) = m\overset{\frown}{VHG}$

$2(F) = 138 + 66$

$2(F) = 204$

$F = 102°$

Inscribed Quad. opp $\angle$'s supp.

$102° + ? = 180°$

$? = 78°$

Ex.4: Solve for the value of '?'

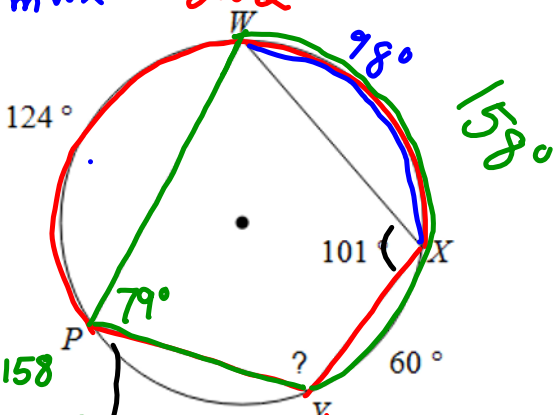
To find '?', you first need to find $m\overset{\frown}{WX}$

opp. ∠'s inscribed quad supp.

$m\angle X + m\angle P = 180$

$101 + m\angle P = 180$

$m\angle P = 79°$



ON: $2(\angle) = arc$

$2(79) = m\overset{\frown}{WY}$

$158° = m\overset{\frown}{WY}$

$m\overset{\frown}{WX} + m\overset{\frown}{XY} = 158$

$m\overset{\frown}{WX} + 60 = 158$

$m\overset{\frown}{WX} = 98$

$m\overset{\frown}{PWX} = 124 + 98 = 222°$

ON: $2(\angle) = arc$

$2(?) = 222$

$? = 111°$