Geometry (G.C.2)
Unit Five: Circles – Inscribed Angles (IC7)

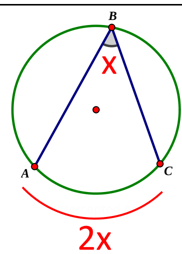
Name: ___________________________
Date: ____________ Period: ________

Inscribed Angle: An angle with its vertex ON the circle and 2 sides formed by chords

$\angle ABC$ is an inscribed angle. $\overset{\frown}{AC}$ is the intercepted arc for $\angle ABC$

Inscribed Angle Theorem #1: If an angle is inscribed in a circle, then its measure is…

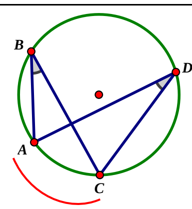
Half the measure of the intercepted arc.



$m\angle ABC = \frac{1}{2}(m\overset{\frown}{AC})$

Inscribed Angle Theorem #2: If two inscribed angles of a circle intercept the same arc, then…

They are ≅ to each other



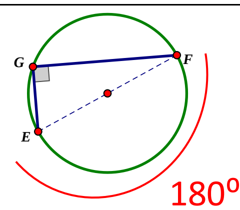
$m\angle ABC = \frac{1}{2}(m\overset{\frown}{AC})$

$m\angle ADC = \frac{1}{2}(m\overline{AC})$

$so,\ m\angle ABC = m\angle ADC$

Inscribed Angle Theorem #3: If one side of an inscribed triangle is a diameter, then…

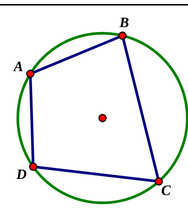
The inscribed angle is a right angle



$m\angle EGF = \frac{1}{2}(180^o) = 90^o$

Inscribed Angle Theorem #4: If a quadrilateral is inscribed in a circle, then…

Opposite angles are always supplementary



$m\angle ABC = \frac{1}{2}(m\overset{\frown}{AC})$

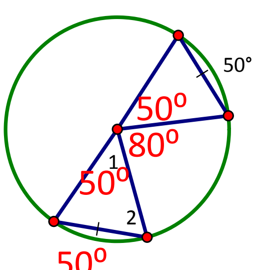
$60^o\ \ + m\angle ADC = \frac{1}{2}(m\overset{\frown}{ABC})$

$m\angle ABC + m\angle ADC = \frac{1}{2}(m\overset{\frown}{AC} + m\overset{\frown}{ABC})$

$m\angle ABC + m\angle ADC = \frac{1}{2}(360) = 180^o$

Determine the requested value(s).

a)



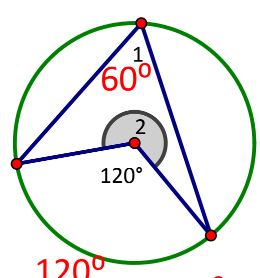
≅ chords → ≅ arcs

$m\angle 1$ = 50^o

$m\angle 2$ = 65^o

$\frac{180-50}{2} = \frac{130}{2}$ (isosceles)

b)

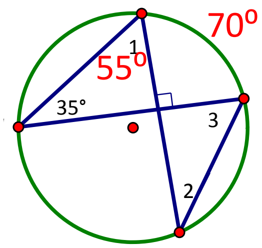


Central angles = arcs

$m\angle 1$ = 60^o ½ (120)

$m\angle 2$ = 240^o 360 - 120

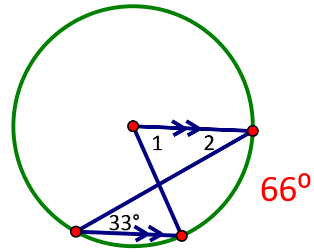
c)



Δs add to 180°

m∠1 = 55° 180 - 90 - 35
m∠2 = 35° ≅ to 35° ∠
m∠3 = 55° ≅ to ∠1

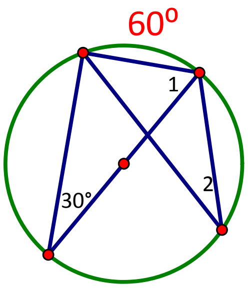
d)



Parallel → alt int ∠s ≅

m∠1 = 66° ⟶ Central angles = arcs
m∠2 = 33°

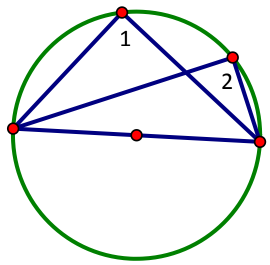
e)



Inscribed ∠ connected to diameter = 90°

m∠1 = 60° 180 – 90 - 30
m∠2 = 30° ≅ to 30° ∠ *or* ½ (60)

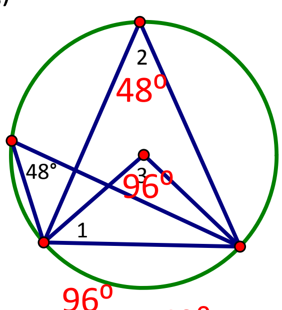
f)



Inscribed ∠s connected to diameter = 90°

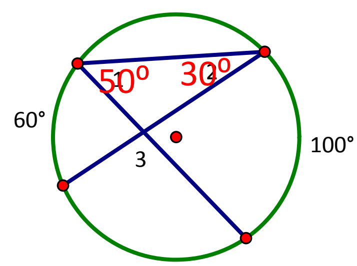
m∠1 = 90°
m∠2 = 90°

g)



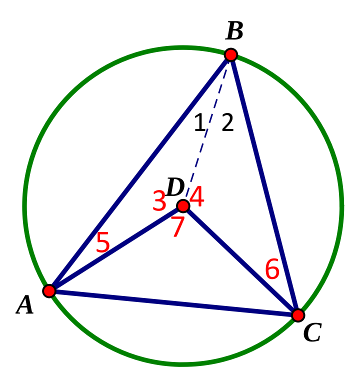
m∠1 = 42° $\frac{180-96}{2} = \frac{84}{2}$ (isosceles)
m∠2 = 48° ≅ to 48° ∠ *or* ½ (96°)
m∠3 = 96° Central ∠*s* = arcs

h)



m∠1 = 50° ½ (100)
m∠2 = 30° ½ (60)
m∠3 = 100° 180 – 50 – 30 → vertical ∠*s*

Prove that m∠ADC = 2(m∠ABC).



1) ΔADB and ΔCDB are isosceles due to ≅ radii
2) ∠1 ≅ ∠5 and ∠2 ≅ ∠6 → base ∠s of isosceles Δ
3) *m*∠7 + m∠3 + m∠4 = 360
4) *m*∠3 = 180 - m∠1 - m∠5 = 180 – 2m∠1
5) *m*∠4 = 180 - m∠2 - m∠6 = 180 – 2m∠2
6) *m*∠7 +180 – 2m∠1+ 180 – 2m∠2 = 360
7) *m*∠7 = 2m∠1 + 2m∠2
8) *m*∠7 = 2(m∠1 + m∠2)
9) *m*∠ADC = 2(m∠*ABC*)