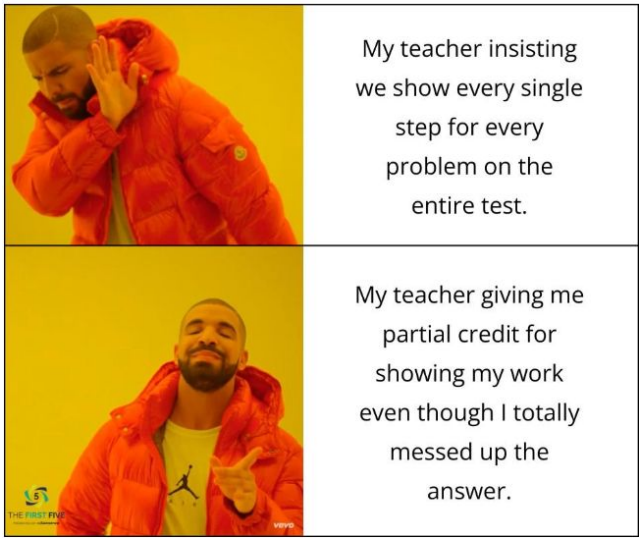
Circles - Chapter 10 Part 2
Angles w/ Circles

Section 4 & 5
2025



Week March 31-April 1 Lesson Plan Overview

Monday: Lesson on Google Classroom links as substitute -

- Edpuzzle instruction video
- Bigideasmath.com online assignment SECTION CHAPTER 10.4

Tuesday: Note packet Page 1 complete with instruction of using inscribed angles 10.4 section

Wednesday: Note packet Page 1 continue to complete with instruction of using angles inside with chords or outside angle with secants and tangent line segments with 10.5 section

Thursday: Soft Practice Book pg 167 - complete for section 10.4

Friday: Soft Practice Book pg 169 - complete for section 10.5

BigIdeasMath.com Textbook sections

Section 10.4: Inscribed Angles and Polygons

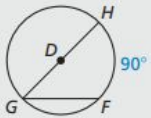
Common Core State Standards: G.C.A.2, G.C.A.3, G.CO.D.13
Learning Target: Use properties of inscribed angles and inscribed polygons.
Success Criteria

- Find measures of inscribed angles and intercepted arcs.
- Find angle measures of inscribed polygons.
- Construct a square inscribed in a circle.

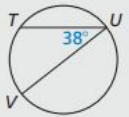
Vocabulary: inscribed angle, intercepted arc, subtend, inscribed polygon, circumscribed circle

Find the indicated measure.

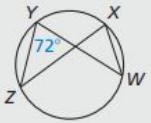
1. $m\angle G$



2. $m\overset{\frown}{TV}$



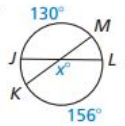
3. $m\angle X$



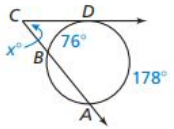
EXAMPLE 2 **Finding an Angle Measure** WATCH

Find the value of x.

a.



b.



SOLUTION

a. The chords $\overline{JL}$ and $\overline{KM}$ intersect inside the circle. Use the Angles Inside the Circle Theorem.

$$x^\circ = \tfrac{1}{2}(m\overset{\frown}{JM} + m\overset{\frown}{LK})$$
$$x^\circ = \tfrac{1}{2}(130^\circ + 156^\circ)$$
$$x = 143$$

b. The tangent $\overrightarrow{CD}$ and the secant $\overrightarrow{CB}$ intersect outside the circle. Use the Angles Outside the Circle Theorem.

$$m\angle BCD = \tfrac{1}{2}(m\overset{\frown}{AD} - m\overset{\frown}{BD})$$
$$x^\circ = \tfrac{1}{2}(178^\circ - 76^\circ)$$
$$x = 51$$

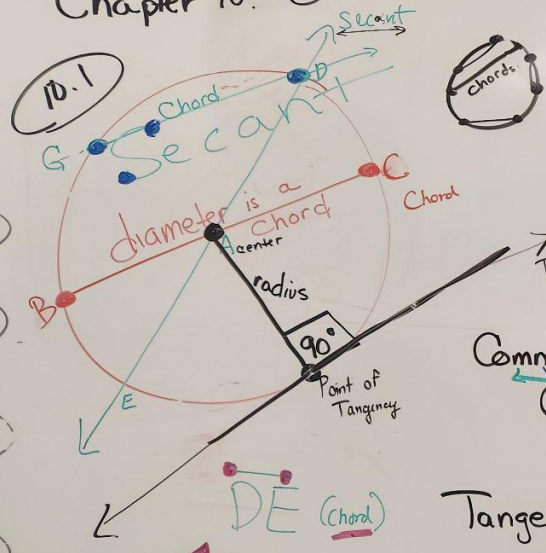
Section 10.5: Angle Relationships in Circles

Common Core State Standards: G.C.A.2
Learning Target: Understand angles formed by chords, secants, and tangents.
Success Criteria

- Identify angles and arcs determined by chords, secants, and tangents.
- Find angle measures and arc measures involving chords, secants, and tangents.
- Use circumscribed angles to solve problems.

Chapter 10: Circles

10.1



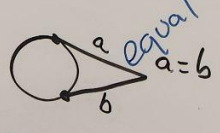
Tangent Line

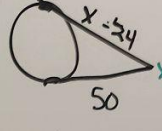
DE (Chord)

DE (Secant)

Common Tangent

Tangent





X-24=50

X=50+24

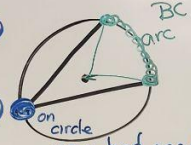
Minor arc = less 180

Semicircle = 180° diameter

major arc = more 180°

10.2

Center angle° = arc°



Inscribed angle = $\frac{1}{2}$(arc)

2 · angle = arc

double

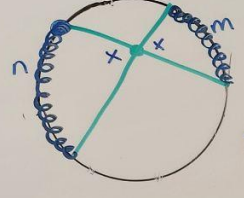
Inscribed angle = $\frac{1}{2}$(central angle)

x + y = 180

m + n = 180

10.4

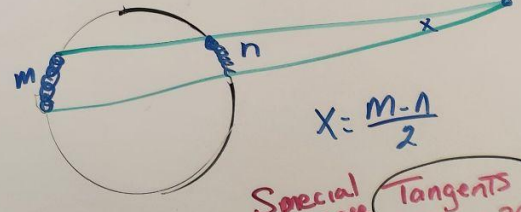
INSIDE angle Average add/2



$X = \frac{m+n}{2}$

10.5

Outside angle Subtract/2



$X = \frac{M-n}{2}$

Special case Tangents m+n=360°

10.4 pg 78 #6-7
10.5 pg 78 #8-16, 19

Name

Geometry

Angles in a Circle Worksheet

Find the measures of the arcs or angles as indicated. Circle the types of angles you see in each diagram. Use these to determine which rules to use. The vertex is emphasized in each circle with a bold point. Some of these are combination problems so you might have to circle more than one!

1. $m\angle$

Where is the vertex located? Center Circle Inside Outside T.P.

ON

inscribed angle

158°

$\frac{158}{2} = 79$

2. $\overset{\frown}{AB}$ and $\overset{\frown}{CD}$

Where is the vertex located? Center Circle Inside Outside T.P.

360° full
−150
−42
−96

96° 42° 180°

$\overset{\frown}{AB}$ = 42 AND $\overset{\frown}{CD}$ = 42°

3. $m\angle B$

Where is the vertex located? Center Circle Inside Outside T.P.

ON

90°

diameter

Semi-Circle 180

$m\angle B$ = 90°

4. $m\angle$

Where is the vertex located? Center Circle Inside Outside T.P.

$x = \frac{m+n}{2}$ arc average

angle

$\frac{83+33}{2} = \frac{116}{2}$ 83

5. $m\angle$

Where is the vertex located? Center Circle Inside Outside T.P.

ON

ON

172°

86°

NOT inscribed angle but same formula

$\frac{172}{2} = 86°$

6. $m\angle$ $x = \frac{1}{2}(m-n)$

Where is the vertex located? Center Circle Inside Outside T.P.

Tangent

117°

243° = m

Tangent

Full Circle 360 − 243

n = 117

63

7. $m\angle$

Where is the vertex located? Center Circle Inside Outside T.P.

$m = 82°$ $n = 43°$

$x = \frac{m-n}{2}$ angle = $\frac{\text{arc}}{2}$ subtract

$\frac{82-43}{2} = 34.5$

8. $m\overset{\frown}{BC}$

Where is the vertex located? Center Circle Inside Outside T.P.

angle = $\frac{1}{2}$ arc

2 angle = arc

80

9. ?

Where is the vertex located? Center Circle Inside Outside T.P.

$x = \frac{1}{2}(243-117) =$

106° = n

115°

x° = m

$x = \frac{1}{2}(m+n)$

angles

$115 = \frac{1}{2}(m+106)$

10.4 Extra Practice

$x = \frac{1}{2}N$

In Exercises 1–6, find the indicated measure.

1. $m\angle B$ 64

2. $m\angle L$ 41

3. $m\overset{\frown}{AB}$ 106

4. $m\overset{\frown}{RS}$ 133

5. $m\overset{\frown}{MN}$ 114

6. $m\angle U$ 66

In Exercises 7–12, find the indicated measure.

7. $m\overset{\frown}{BC}$

8. $m\angle A$

9. $m\angle C$

10. BC

11. $m\overset{\frown}{AC}$

12. $m\overset{\frown}{AB}$

13. Name two pairs of congruent angles.

In Exercises 14 and 15, find the value of each variable.

14. 150 — opposite angle inscribed quad are supplementary — 360 − 120 = 320 — $m = \frac{120}{2}$ — $m = 110$

15. $m = 80$

$m + 100 = 180$

10.5 Extra Practice

April 4

In Exercises 1–3, line ℓ is tangent to the circle. Find the indicated measure.

1. $m\overset{\frown}{AB} = 140$

2. $m\overset{\frown}{XY} = 144$

3. $m\angle 2 = 52$

In Exercises 4–8, find the value of x.

4. 2 chords — $x = \frac{1}{2}(m+n)$ — $x = \frac{1}{2}(97+35)$ — $x = 66$

5. 2 tangents — $x = \frac{1}{2}(m-n)$

6. $x = \frac{1}{2}(m-n)$ — $38 = \frac{1}{2}(m-72)$ — $76 = m - 72$ — $148 = m$

7. 50

8. 81

9. The diagram shows the portion of [illegible] from the top of Mount Townsend at point R. Find $m\overset{\frown}{ST}$.

$6x - 19 = \frac{1}{2}(m - m)$ — arcs — $6x - 19 = \frac{1}{2}(245 - 115)$ — subtracting — $6x - 19 = 65$ — $6x = 84$ — $x = 14$

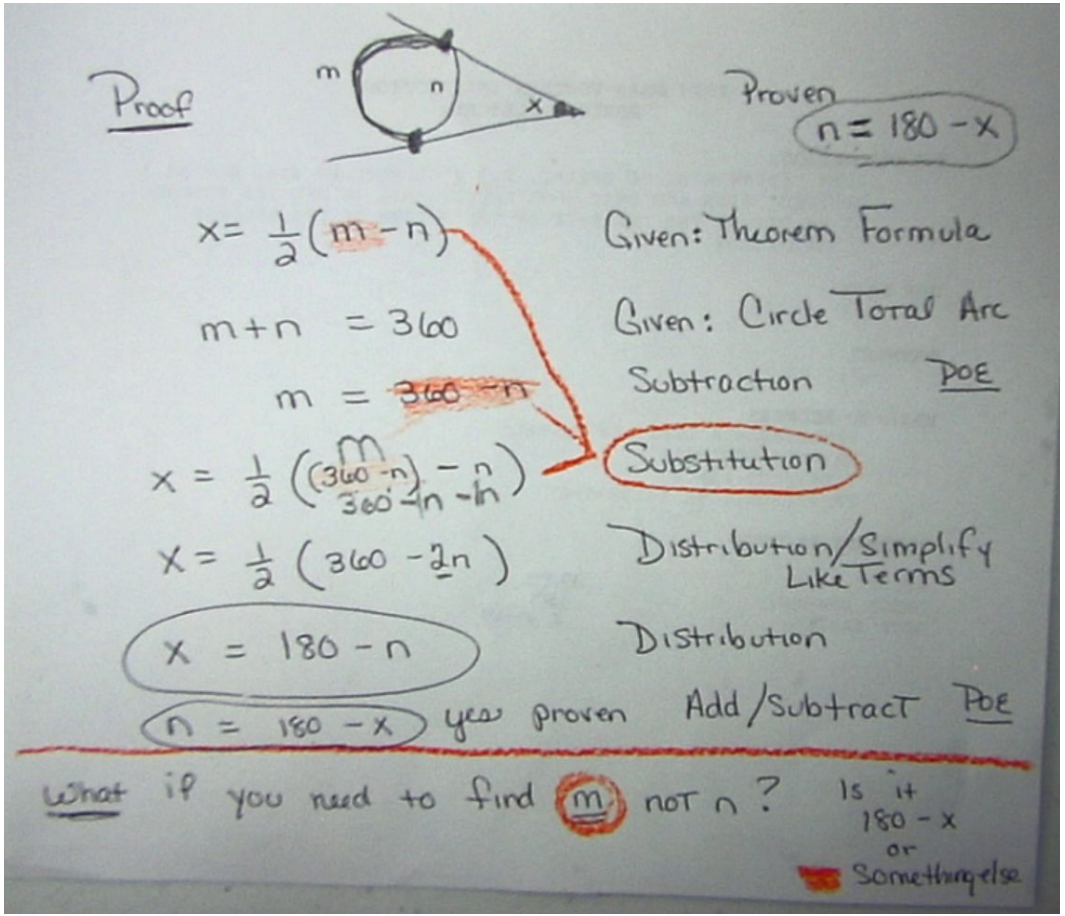
CP Period 2 --- Proof of special case on 2 tangents

N = 180 - x

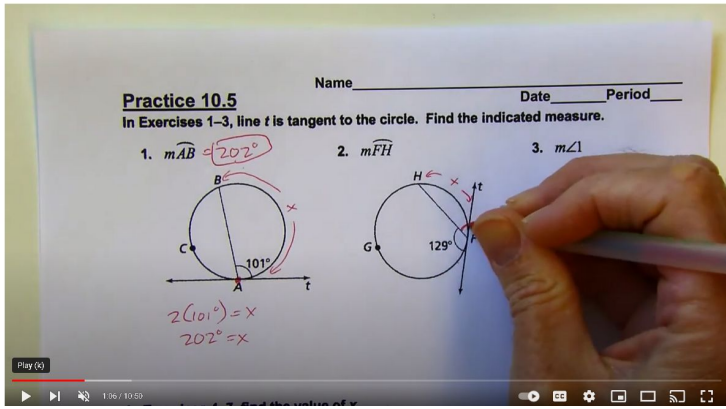
What if given x but not n,

Need to find M

What works as shortcut then?



--- Angles cont.



Complete 10.5 Practice A from packet

Note: The video found by a student has an incorrect

https://www.youtube.com/watch?v=U2GOGdQ0sBg

Answer for #1 --- missed concept on minor arc notation. It is 158.

Kuta software Secant angles page.

https://www.youtube.com/watch?v=6k4DH97BLgI

For problems such as Kuta #10, students only have to “setup” equations and not solve the algebra.