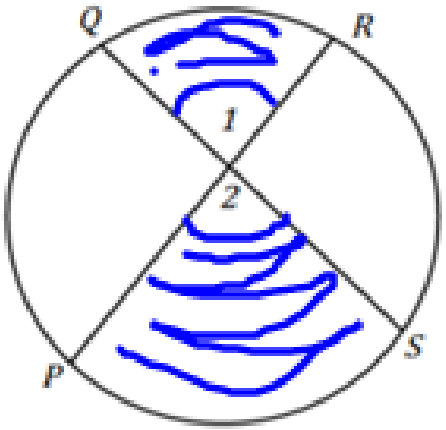
Sometimes, two chords do not intersect "on" the circle, but "in" the circle.

These chords cannot be called inscribed angles.

When two chords intersect "inside" a circle, two sets of Vertical angles are formed.

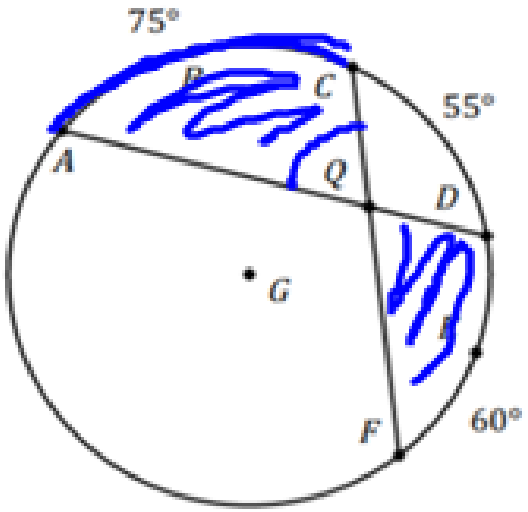
Consider the figure below.



The angle formed inside of a circle by two intersecting chords is 1/2 of the sum of the chords' intercepted arcs.

Using the above circle as an example, angles 1 and 2 can be found using the function $m\angle 1 = \frac{1}{2}(m\overset{\frown}{QR} + m\overset{\frown}{PS})$

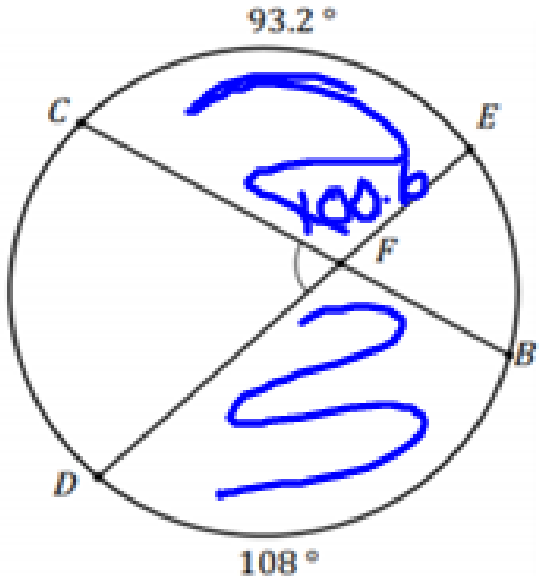
1. Consider the figure below, and determine $m\angle AQC$.



$\frac{1}{2}(75+60) = m\angle AQC$

$67.5 = m\angle AQC$

2. Consider the diagram below and find $m\angle CFD$. Justify your answer.

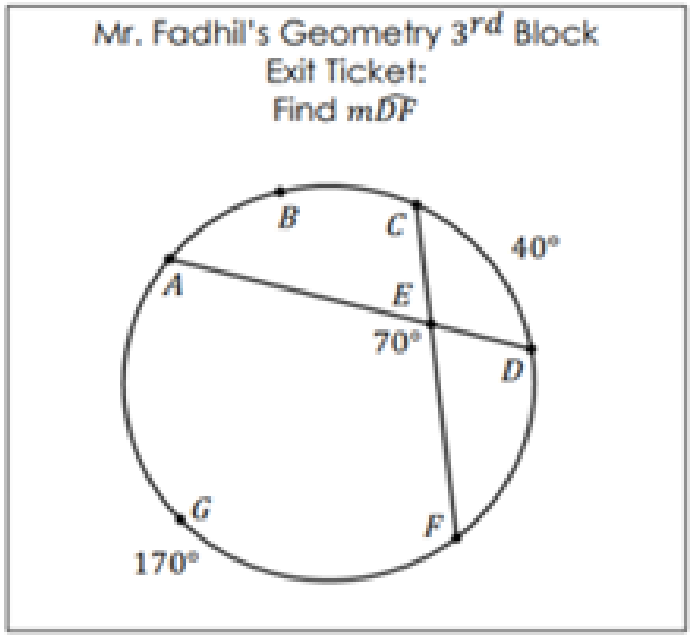


$m\angle CFE = \frac{1}{2}(93.2+108)$

$= 100.6$

$180 - 100.6 = 79.4$

Mr. Fadhil gave the daily exit ticket shown in the diagram to his Geometry students.



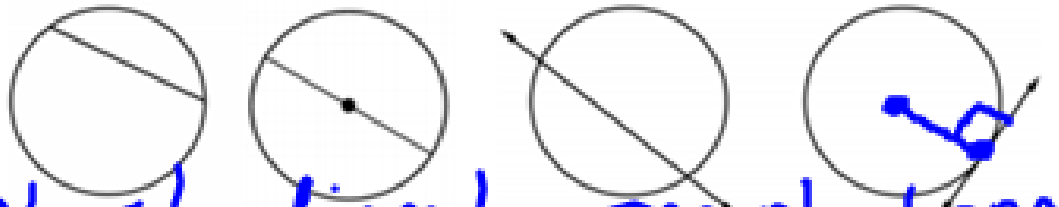
One of Mr. Fadhil's students argued that there was something wrong with this problem, based on the above diagram and the measurements.

What is the error in this problem? Justify your answer.

$(170+40)\frac{1}{2} = 105 \neq 70$

Tangent Lines, Secants, and Chords – Part 1

Let's examine the following figures.



Chord diameter secant tangent

What differences do you see among these figures?

Lines are in different positions

Which of these figure(s) have you not seen yet?

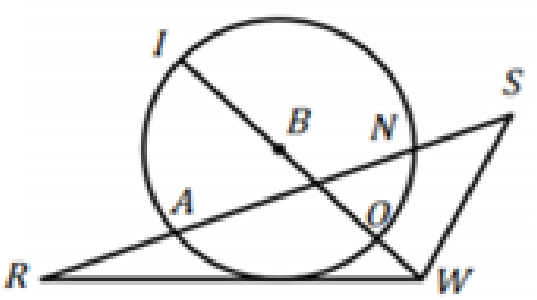
Last 2

A ***secant*** is a line that intersects a circle at 2 points.

A ***tangent*** is a line in the plane of a circle that intersects the circle at exactly 1 point.

1. Classify each of the following segments as a radius, chord, secant, tangent, or diameter.

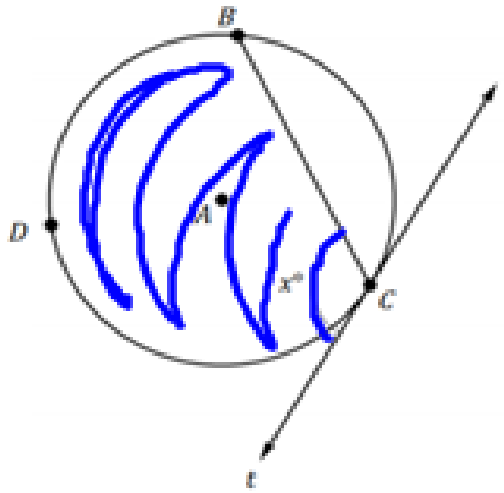
$\overline{IB}$ is a radius.
$\overline{AN}$ is a chord.
$\overline{WR}$ is a tangent.
$\overline{RS}$ is a secant.
$\overline{IO}$ is a diameter.



2. Mark the most appropriate answer for each statement in the table below.

Statements	Always	Sometimes	Never
A chord is part of a secant.	●	o	o
A diameter is a tangent.	o	o	●
A tangent is a ray.	o	●	o
A tangent has exactly one point in common with a circle.	●	o	o
A secant to a circle contains the diameter.	o	●	o
A chord in a circle contains a radius.	o	●	o

Consider the diagram below.



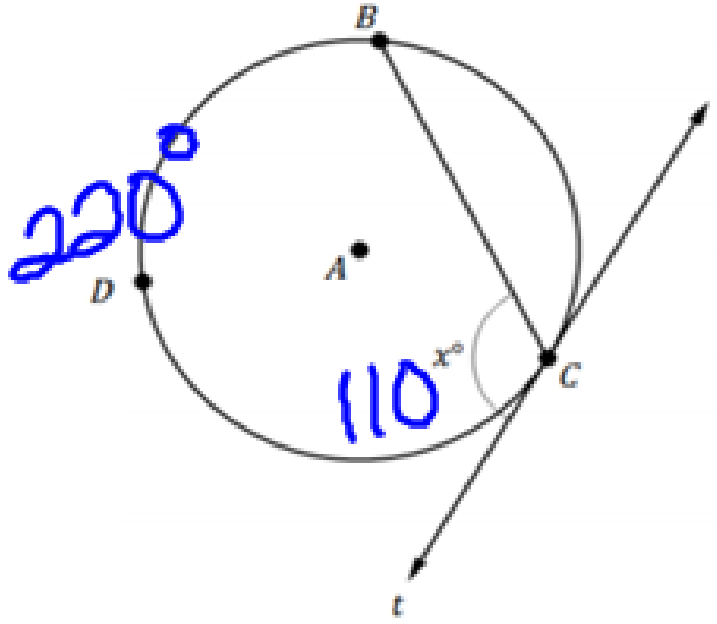
Circle A has chord $\overline{BC}$ and tangent line t through C. The chord and the tangent line form an angle measuring $x°$. What do you think is the value of x in the above figure?

$m\angle x = \frac{1}{2} m\overset{\frown}{BDC}$

Chord Tangent Angle Theorem

The measure of an **angle** formed by a **chord** and a **tangent** line is **1/2** the measure of the **intercepted** arc.

1. Consider the diagram below.

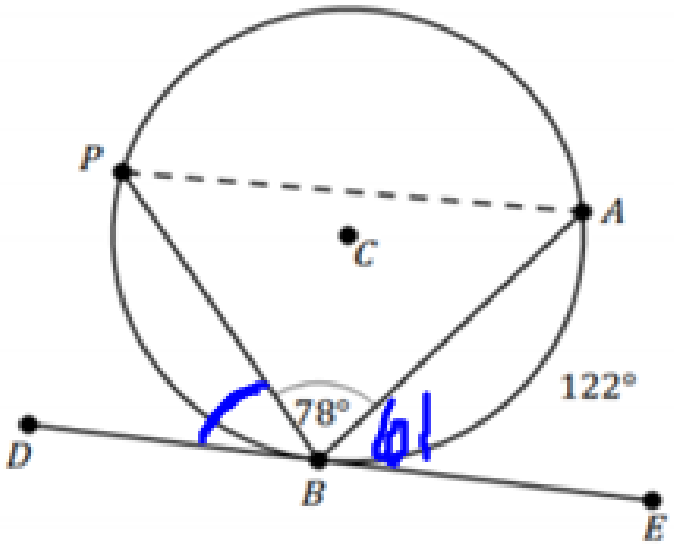


If $m\overset{\frown}{CDB}$ is 220°, then what is the ~~supplement of the angle~~ measuring $x°$? Justify your answer.

$\frac{220}{2} = 110$

180
−110
70

Consider the diagram below.

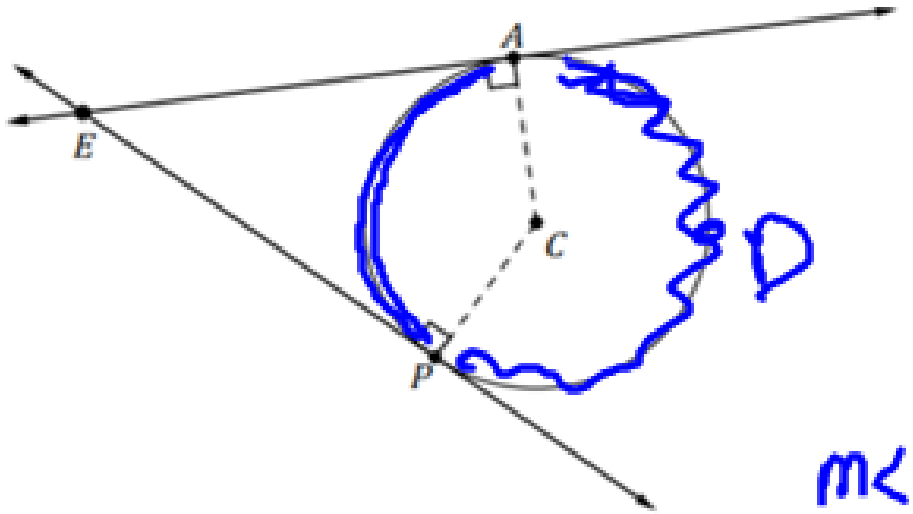


a. Determine the $m\angle PBD$.

$\frac{122}{2} = 61$

78 + 61 = 139

180 − 139 = 41



$m\angle E = \frac{1}{2}(m\overset{\frown}{ADP} - m\overset{\frown}{AP})$

$\angle AEP$ is a Circumscribed angle.

A Circumscribed angle is an angle with rays tangent to the circle. It is equal to 1/2 of the difference between the intercepted arcs.

The Circumscribed angle and the central angle formed by the same arcs are Supplementary angles.

$m\angle B + m\angle ACP = 180$