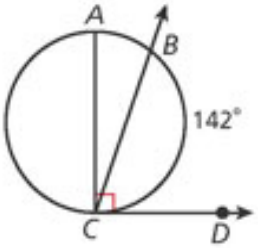
12-5 Angle Relationships in Circles

1 Using Tangent-Secant and Tangent-Chord Angles

Find each measure.

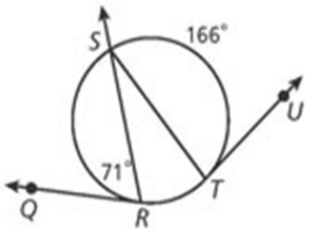
A $m\angle BCD$

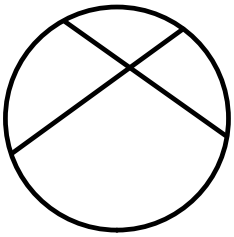
B $m\overset{\frown}{ABC}$



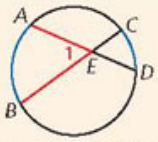
$m\angle STU$

$m\overset{\frown}{SR}$





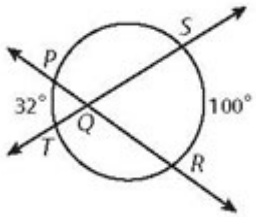
Theorem 12-5-2

THEOREM	HYPOTHESIS	CONCLUSION
If two secants or chords intersect in the interior of a circle, then the measure of each angle formed is half the sum of the measures of its intercepted arcs.	 Chords $\overline{AD}$ and $\overline{BC}$ intersect at E.	

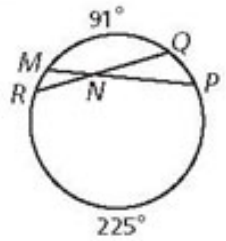
2 Finding Angle Measures Inside a Circle

Find each angle measure.

$m\angle SQR$

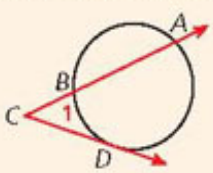


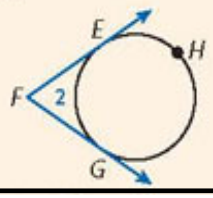
2b. $m\angle RNM$

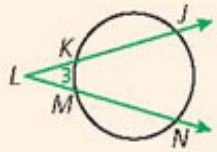


Theorem 12-5-3

If a **tangent and a secant**, **two tangents**, or **two secants** intersect in the exterior of a circle, then the measure of the angle formed is half the difference of the measures of its intercepted arcs.



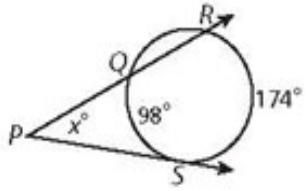




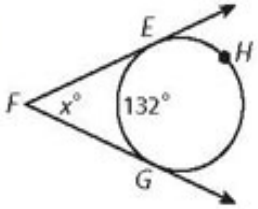
3 Finding Measures Using Tangents and Secants

Find the value of x.

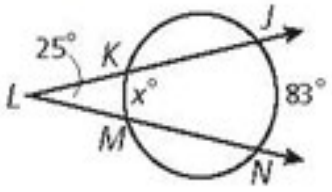
A



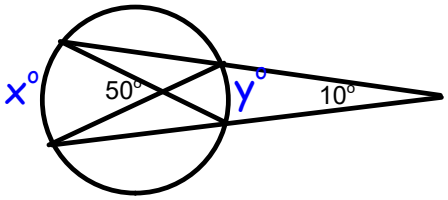
B



C



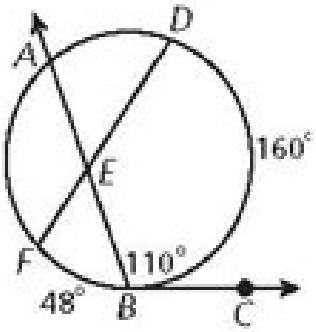
D



x = ___

y = ___

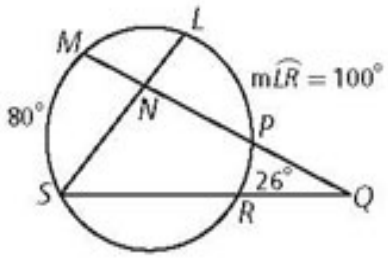
5 Finding Arc Measures



Find: $m\overset{\frown}{ADB}$ = _____

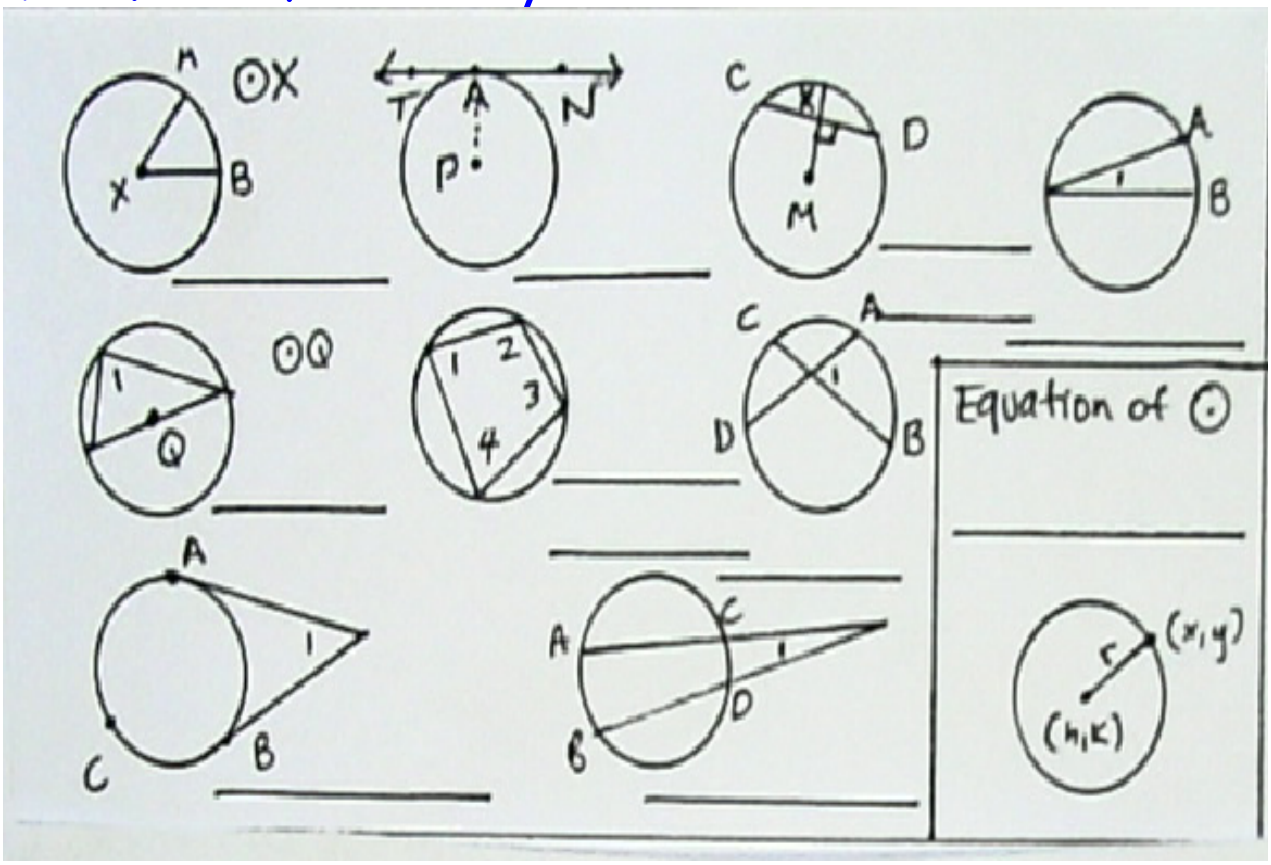
$m\overset{\frown}{AD}$ = _____

$m\overset{\frown}{AF}$ = _____



Find $m\overset{\frown}{LP}$.

Formulas for Today:



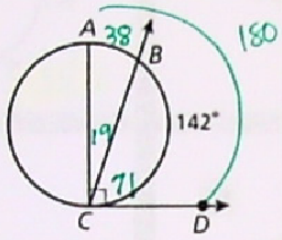
12-5 Angle Relationships in Circles

1 Using Tangent-Secant and Tangent-Chord Angles

Find each measure.

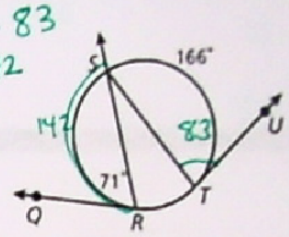
A $m\angle BCD = 71$

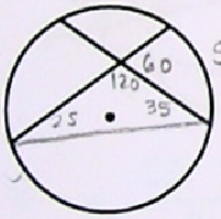
B $m\widehat{ABC} = 180$



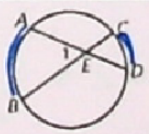
$m\angle STU = 83$

$m\widehat{SR} = 142$





Theorem 12-5-2

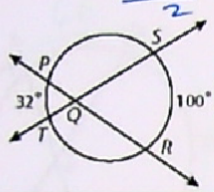
THEOREM	HYPOTHESIS	CONCLUSION
If two secants or chords intersect in the interior of a circle, then the measure of each angle formed is half the sum of the measures of its intercepted arcs.	 Chords $\overline{AD}$ and $\overline{BC}$ intersect at E.	$m\angle 1 = \frac{m\overset{\frown}{CD} + m\overset{\frown}{AB}}{2}$

$m\angle MNQ = \frac{91+225}{2} = 158$

2 **Finding Angle Measures Inside a Circle**

Find each angle measure.

$m\angle SQR = \frac{32+100}{2}$

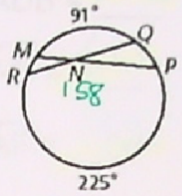


66°

2b. $m\angle RNM$

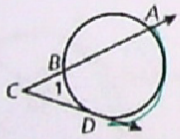
180 − 158

22°

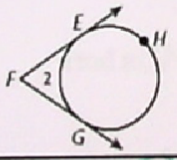


Theorem 12-5-3

If a tangent and a secant, two tangents, or two secants intersect in the exterior of a circle, then the measure of the angle formed is half the difference of the measures of its intercepted arcs.



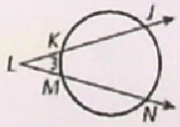
$m\angle C = \frac{1}{2}(AD - BE)$



$m\angle F = \frac{1}{2}(EHG - EG)$

and

$\angle F$ supp $\overset{\frown}{EG}$



$m\angle L = \frac{1}{2}(JN - KM)$

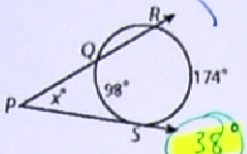
$x = \frac{174-98}{2}$

3 **Finding Measures Using Tangents and Secants**

Find the value of x.

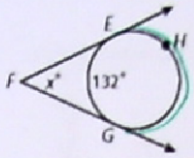
48

A



38°

B

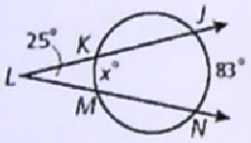


228

$x = \frac{228-132}{2}$

$96 = 48$

C

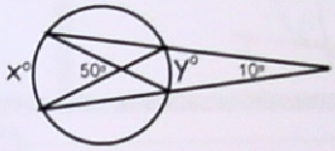


$25 = \frac{83-x}{2}$

$50 = 83 - x$

$33 = x$

D



$\frac{x+y}{2} = 50$

$\frac{x-y}{2} = 10$

$x = 60$

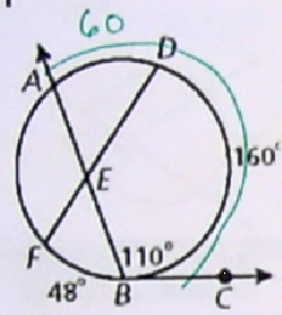
$y = 40$

$x + y = 100$

$x - y = 20$

$2x = 120$

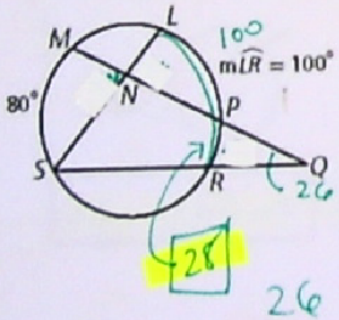
5 **Finding Arc Measures**



Find: $m\overset{\frown}{ADB}$ = 220

$m\overset{\frown}{AD}$ = 60

$m\overset{\frown}{AF}$ = 92



Find $m\overset{\frown}{LP}$. 72°

100 − 28

or

$26 = \frac{80 - x}{2}$

$52 = 80 - x$