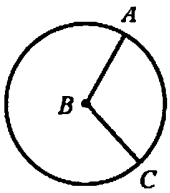
Name: Key!

Geometry Review: Packet #6

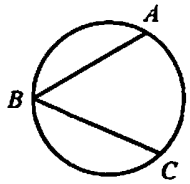
Topic #1: Arcs & Angles in Circles

Central Angles



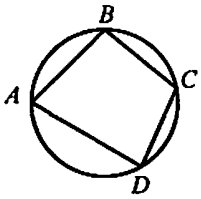
$m\angle ABC = m\widehat{AC}$

Inscribed Angles



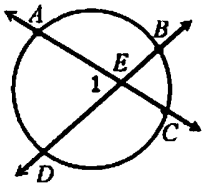
$m\angle ABC = \frac{1}{2} m\widehat{AC}$

Inscribed Quadrilaterals



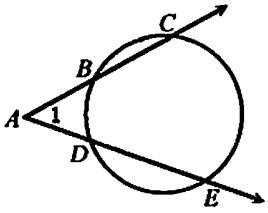
$m\angle A + m\angle C = 180°$
$m\angle B + m\angle D = 180°$

Two Chords/Secants (Interior)



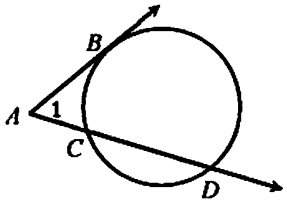
$m\angle 1 = \frac{1}{2}(m\widehat{AD} + m\widehat{BC})$

Two Secants (Exterior)



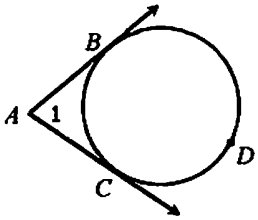
$m\angle 1 = \frac{1}{2}(m\widehat{CE} - m\widehat{BD})$

Secant & Tangent (Exterior)



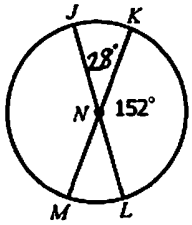
$m\angle 1 = \frac{1}{2}(m\widehat{BD} - m\widehat{BC})$

Two Tangents (Exterior)



$m\angle 1 = \frac{1}{2}(m\widehat{BDC} - m\widehat{BC})$

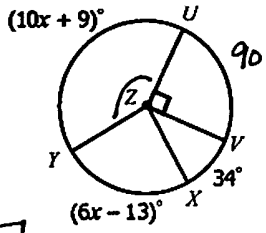
1. Find $m\widehat{JK}$



$180 - 152 = 28°$

$\boxed{\widehat{JK} = 28°}$

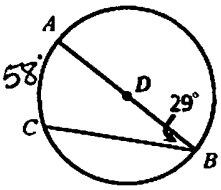
2. Find $m\angle YZU$.



$16x + 120 = 360$
$16x = 240$
$x = 15$

$\angle YZU$: $10(15) + 9 = \boxed{159°}$

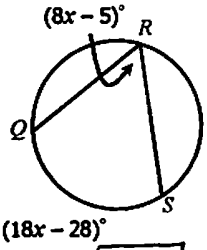
3. Find $m\widehat{BC}$



$\widehat{AC} = 29 \cdot 2 = 58°$

$\widehat{BC} = 180 - 58 = \boxed{122°}$

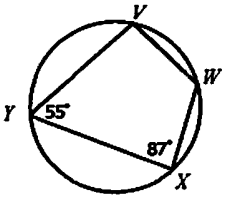
4. Find $m\angle QRS$.



$2(8x - 5) = 18x - 28$
$16x - 10 = 18x - 28$
$18 = 2x$
$9 = x$

$\angle QRS$: $8(9) - 5 = \boxed{67°}$

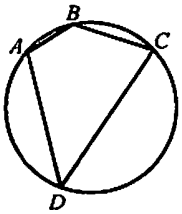
5. Find $m\angle W$ and $m\angle V$.



$\angle Y + \angle W = 180$
$55 + \angle W = 180$
$\boxed{\angle W = 125°}$

$\angle V + \angle X = 180$
$\angle V + 87 = 180$
$\boxed{\angle V = 93°}$

6. If $m\angle B = (14x - 21)°$ and $m\angle D = (4x + 3)°$, solve for x.

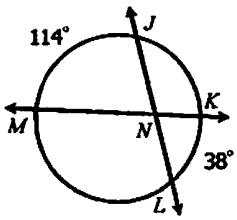


$14x - 21 + 4x + 3 = 180$
$18x - 18 = 180$
$18x = 198$
$\boxed{x = 11}$

7. Find $m\angle MNJ$.

$\frac{1}{2}(114+38)$

$\boxed{=76^\circ}$

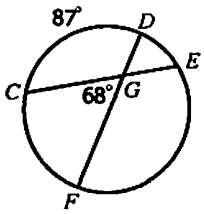


8. Find $m\widehat{FE}$

$112=\frac{1}{2}(87+x)$

$224=87+x$

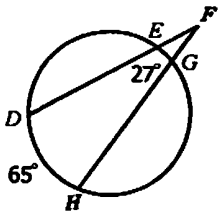
$\boxed{137^\circ=x}$



9. Find $m\angle EFG$.

$\frac{1}{2}(65-27)$

$\boxed{=19^\circ}$

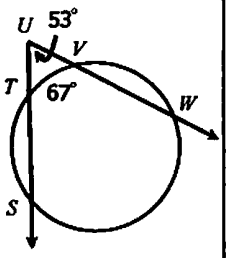


10. Find $m\widehat{SW}$.

$53=\frac{1}{2}(x-67)$

$106=x-67$

$\boxed{x=173^\circ}$

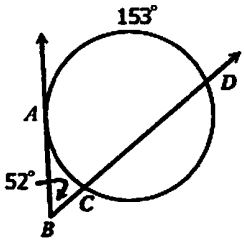


11. Find $m\widehat{AC}$.

$52=\frac{1}{2}(153-x)$

$104=153-x$

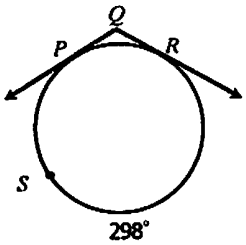
$\boxed{x=49^\circ}$



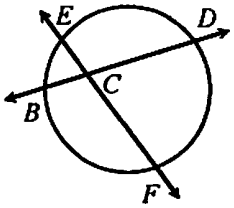
12. Find $m\angle PQR$.

$\frac{1}{2}(298-62)$

$\boxed{=118^\circ}$



13. If $m\widehat{EB}=(4x+1)^\circ$, $m\widehat{DF}=(12x+11)^\circ$, and $m\angle DCF=(9x-1)^\circ$, find $m\angle DCF$.



$9x-1=\frac{1}{2}(4x+1+12x+11)$

$18x-2=16x+12$

$2x=14$

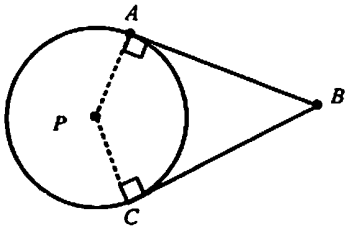
$x=7$

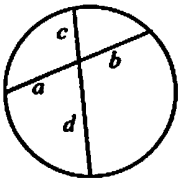
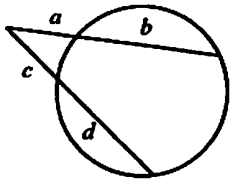
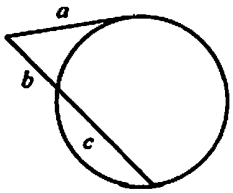
$9(7)-1=\boxed{62^\circ}$

Topic #2: Segment Lengths in Circles

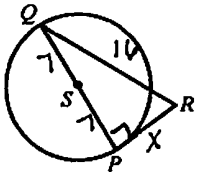
Properties of Tangent Lines:

- If a line is tangent to a circle, then it is perpendicular to the radius.
- If two segments from the same external point are tangent to a circle, then they are congruent.



Chords	Secants	Secant & Tangent
		
$a\cdot b=c\cdot d$	$a(a+b)=c(c+d)$	$a^2=b(b+c)$

14. If $\overline{PR}$ is tangent to circle S, $QS = 7$, and $QR = 16$, find PR.



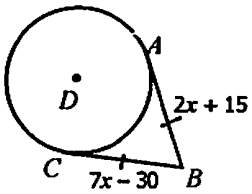
$14^2 + x^2 = 16^2$

$196 + x^2 = 256$

$x^2 = 60$

$\boxed{x = 7.7}$

15. If $\overline{AB}$ and $\overline{BC}$ are tangent to circle D, find BC.



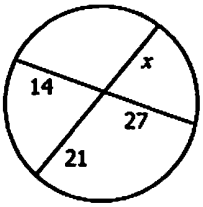
$7x - 30 = 2x + 15$

$5x = 45$

$x = 9$

BC: $7(9) - 30 = \boxed{33}$

16. Find the value of x.

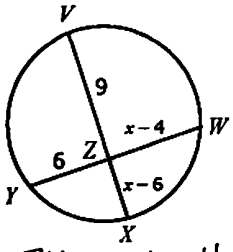


$14 \cdot 27 = x \cdot 21$

$378 = 21x$

$\boxed{18 = x}$

17. Find VX.



$9(x-6) = 6(x-4)$

$9x - 54 = 6x - 24$

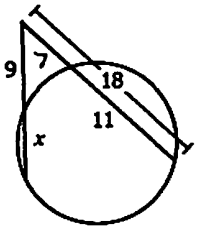
$3x = 30$

$x = 10$

$ZX: 10 - 6 = 4$

$VX = 9 + 4 = \boxed{13}$

18. Find the value of x.



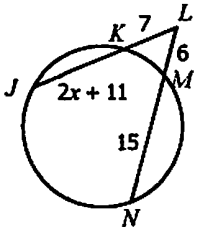
$9(9+x) = 18(7)$

$81 + 9x = 126$

$9x = 45$

$\boxed{x = 5}$

19. Find JK.



$7(2x+18) = 6(21)$

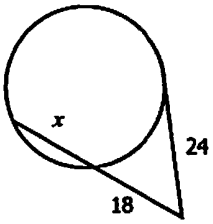
$14x + 126 = 126$

$14x = 0$

$x = 0$

$JK: 2(0) + 11 = \boxed{11}$

20. Find the value of x.



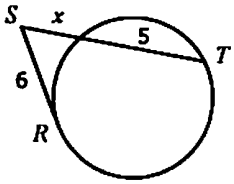
$24 \cdot 24 = 18(18 + x)$

$576 = 324 + 18x$

$252 = 18x$

$\boxed{14 = x}$

21. Find ST.



$6 \cdot 6 = x(x+5)$

$36 = x^2 + 5x$

$0 = x^2 + 5x - 36$

$0 = (x+9)(x-4)$

$x + 9 = 0$ | $x - 4 = 0$

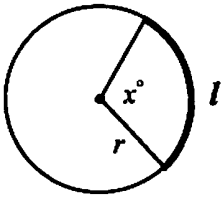
$\cancel{x = -9}$ | $x = 4$

$ST: 4 + 5$

$\boxed{= 9}$

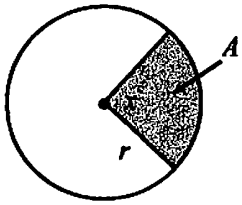
Topic #3: Arc Lengths & Area of Sectors

Arc Length Formula



$$l = \frac{x \cdot 2\pi r}{360}$$

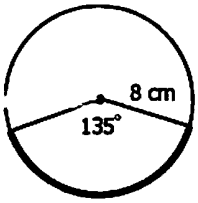
Area of Sector Formula



$$A = \frac{\pi r^2 \cdot x}{360}$$

Find the length of each bolded arc. Round to the nearest hundredrth.

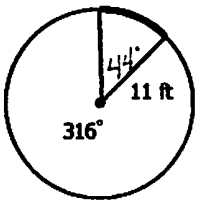
22.



$l = \frac{135 \cdot 2\pi(8)}{360}$

$\boxed{l = 18.85}$

23.

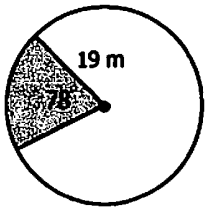


$l = \frac{44 \cdot 2\pi(11)}{360}$

$\boxed{l = 8.45}$

Find the area of each shaded sector. Round to the nearest hundredrth.

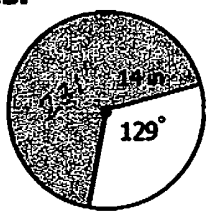
24.



$A = \frac{78 \cdot \pi(19)^2}{360}$

$\boxed{A = 245.72\ m^2}$

25.



$A = \frac{231 \cdot \pi(14)^2}{360}$

$\boxed{= 395.11\ in^2}$

Topic #4: Equations of Circles

Equation of a Circle: $(x-h)^2 + (y-k)^2 = r^2$

(h, k) is the center and r is the radius

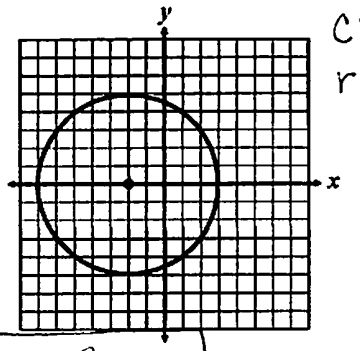
26. Identify the center, radius, and diameter of a circle with the equation $(x - 1)^2 + (y + 4)^2 = 81$.

$C = (1, -4)$

$r = 9$

$d = 18$

27. Write an equation for the circled graphed below.



C: (-2, 0)

r: 5

$\boxed{(x+2)^2 + y^2 = 25}$

28. Given a point on a circle at (1, -7) and a center at (-6, -4), write the equation of the circle.

$d = \sqrt{(-6-1)^2 + (-4+7)^2}$

$d = \sqrt{49 + 9}$

$d = \sqrt{58} \approx 7.6$ ← radius

$\boxed{(x+6)^2 + (y+4)^2 = 58}$

29. If the diameter of a circle has endpoints (13, 10) and (5, 16), write the equation of the circle.

$d = \sqrt{(5-9)^2 + (16-13)^2}$

$d = \sqrt{16 + 9}$

$d = \sqrt{25} = 5$

↑ radius

$M = \left(\frac{13+5}{2}, \frac{10+16}{2}\right)$

$M = (9, 13)$ ← center

$\boxed{(x-9)^2 + (y-13)^2 = 25}$