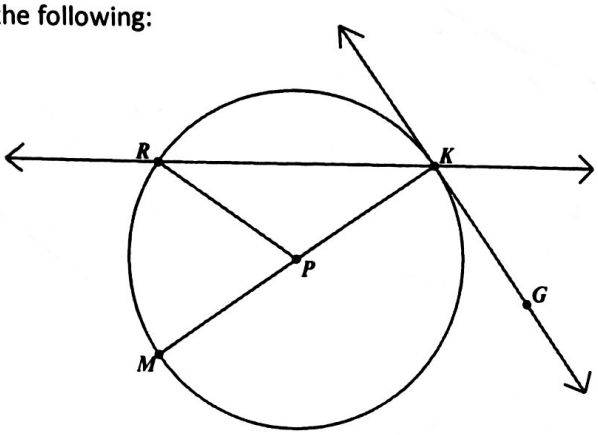
HNCM3 Unit 7: Circles- A Geometric Perspective
Review Packet

Name: Key

Vocabulary

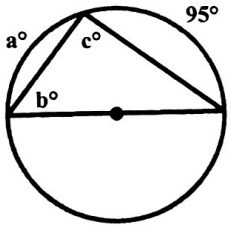
Given the figure, what name applies to each of the following:



a) $\overline{MK}$ Diameter
b) $\overleftrightarrow{RK}$ Secant
c) P Center
d) $\overline{PR}$ Radius
e) $\overline{RK}$ Chord
f) $\overline{PM}$ Radius
g) $\overleftrightarrow{GK}$ Tangent
h) $\widehat{RM}$ Minor Arc
i) $\angle RPK$ Central Angle
j) $\angle RKP$ Inscribed Angle

Arcs, Angles, and Segments Practice: Find the value of each variable. Assume that lines that appear to be tangent are tangent.

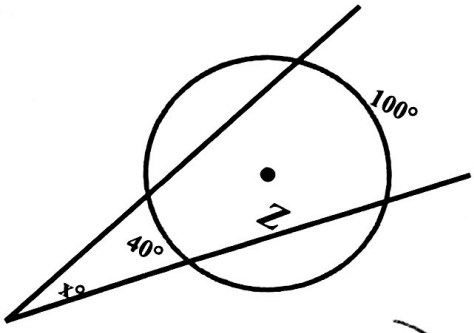
1. a°= 85°
   b°= 47.5°
   c°= 90°



Diameter

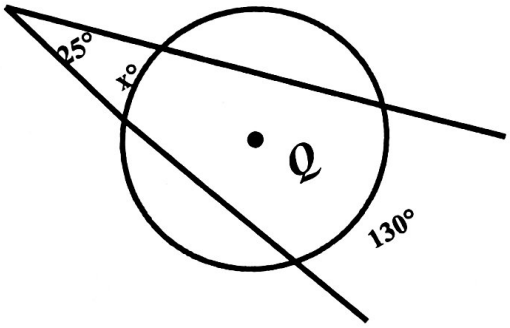
$180° - 95° = a°$
$b° = \frac{1}{2}(95°)$
$c° = \frac{1}{2}(180°)$

2. x = 30°



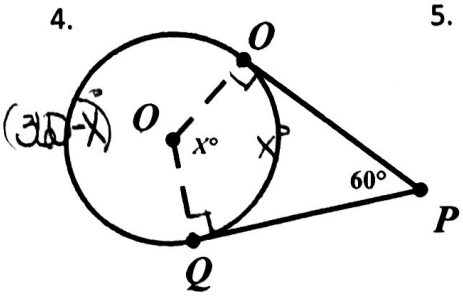
$x° = \frac{1}{2}(100° - 40°)$

3. x = 80°



$25° = \frac{1}{2}(130° - x°)$
$50° = 130° - x°$

4.



x = 120°

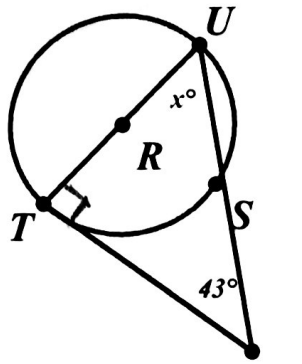
$x° = 360° - (90° + 60° + 90°)$

or

$60° = \frac{1}{2}(360 - x - x)°$

$120° = 360° - 2x$

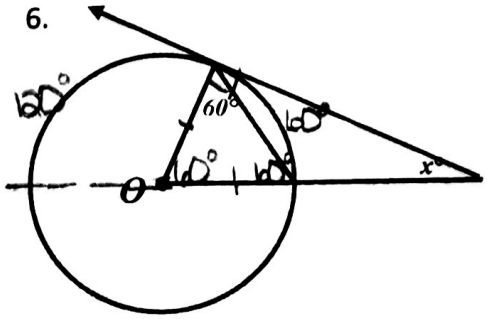
5.



x = 47°

$x° = 180° - (90° + 43°)$

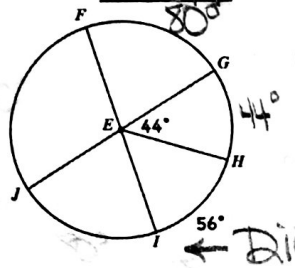
6.



x = 30°

$x° = \frac{1}{2}(120° - 60°)$

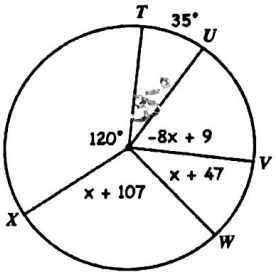
7. $m\widehat{HF}$ = 124° 80°



← Diameter

$m\widehat{FG} = 180° - (44° + 56°)$
$= 80°$

8. $m\widehat{VW}$ = 40



$35 - 8x + 9 + x + 47 + x + 107 + 120 = 360$

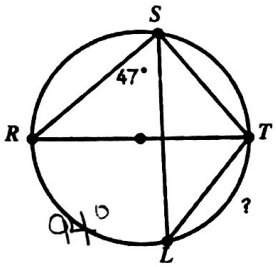
$-6x + 318 = 360$

$-6x = 42$

$x = -7$

$m\widehat{VW} = x + 47 = -7 + 47$

9. $m\widehat{TL}$ = 86°

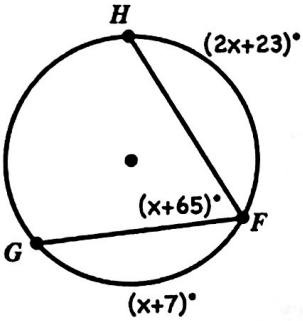


← Diameter

$m\widehat{RL} = 2(47°) = 94°$

$m\widehat{TL} = 180° - 94° = 86°$

10. $m\angle HFG$ = 105°



$m\widehat{GH} = 2(x + 65) = 2x + 130$

$2x + 130 + 2x + 23 + x + 7 = 360$

$5x + 160 = 360$

$5x = 200$

$x = 40$

$m\angle HFG = x + 65 = 40 + 65$

11.

a) $m\angle F$ = $\frac{1}{2}(60° + 115°) = 87.5°$

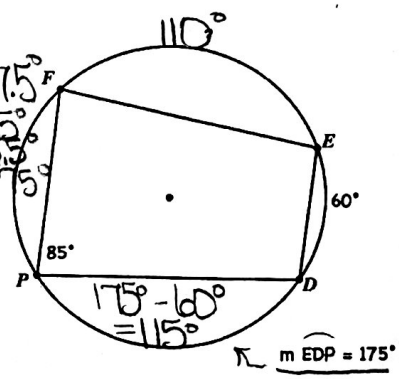
b) $m\angle E$ = $\frac{1}{2}(115° + 75°) = 95°$

c) $m\angle D$ = $\frac{1}{2}(110° + 75°) = 92.5°$

d) $m\widehat{EF}$ = 110°

e) $m\widehat{DP}$ = 115°

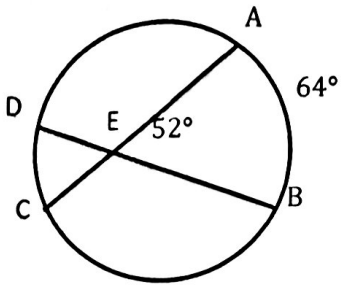
f) $m\widehat{PF}$ = 75°



$m\widehat{FE} + 60° = 2(85°)$

$m\widehat{PF} = 360° - (110° + 60° + 115°) = 75°$

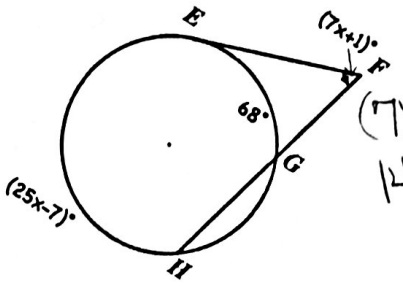
12. $m\widehat{CD}$ = 40°



$52° = \frac{1}{2}(m\widehat{CD} + 64°)$

$104° = m\widehat{CD} + 64°$

13. x = 7

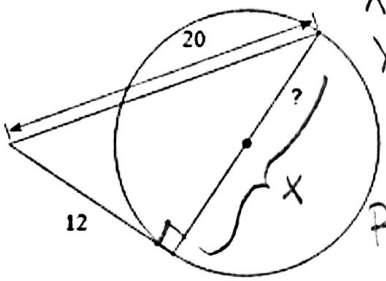


$(7x+1)° = \frac{1}{2}(25x - 7 - 68)°$

$14x + 2 = 25x - 75$

$77 = 11x$

14. Radius = 8



$x^2 + 12^2 = 20^2$

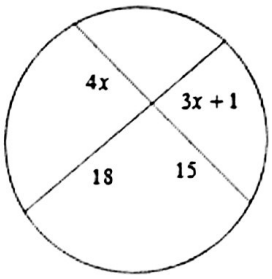
$x^2 + 144 = 400$

$x^2 = 256$

$x = 16$

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

15. x = 3

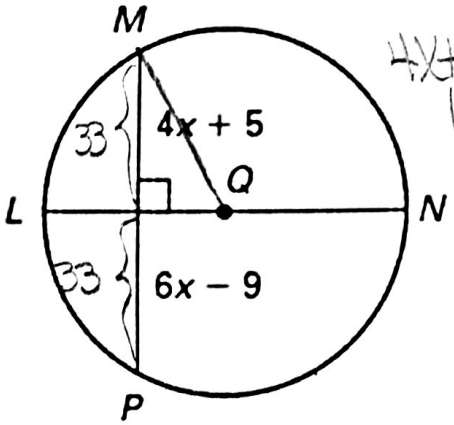


$4x(15) = 18(3x+1)$

$60x = 54x + 18$

$6x = 18$

? 16. ~~MP~~ $\overline{x}$ = 7

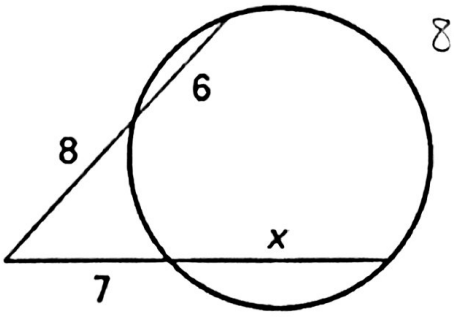


$4x + 5 = 6x - 9$

$14 = 2x$

$7 = x$

17. x = 9



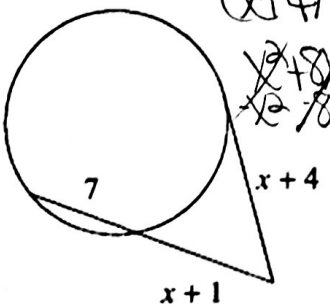
$8(8+6) = 7(7+x)$

$112 = 49 + 7x$

$63 = 7x$

$9 = x$

18. x = 8



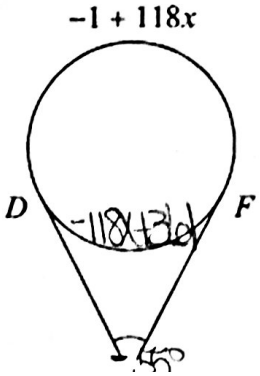
$(x+4)^2 = (x+1)(x+1+7)$ $x+8$

$\cancel{x^2} + 8x + 16 = \cancel{x^2} + 9x + 8$

$\cancel{+x^2} \cancel{-8x} - 8 \quad \cancel{+x^2} - 8x + 8$

$8 = x$

19. x = 2 $\quad m\widehat{DF}$ = 125° $-118(2)+360$



$m\widehat{DF} = 360 - (-1 + 118x)$

$= -118x + 360$

$55° = \frac{1}{2}[(-1+118x) - (-118x+360)]$

$110° = 236x - 360$

$470 = 236x$

$2 = x$

Arc Length and Area of a Sector.

20. Given a circle with radius 10, what is the **arc length** and **area of a sector** having an arc of:

a) 90° b) 72° c) 180° d) 216°

Arc length: $\frac{90}{360}\cdot 2\pi(10) = 15.71$ $\frac{72}{360}\cdot 2\pi(10) = 12.57$ $\frac{180}{360}\cdot 2\pi(10) = 31.42$ $\frac{216}{360}\cdot 2\pi(10) = 37.70$

Sector Area: $\frac{90}{360}\cdot \pi(10)^2 = 78.54^2$ $\frac{72}{360}\cdot \pi(10)^2 = 62.83^2$ $\frac{180}{360}\cdot \pi(10)^2 = 157.08^2$ $\frac{216}{360}\cdot \pi(10)^2 = 188.50^2$

21. In a circle with radius 2, a sector has an area π. What is the arc length of the sector?

Sector Area $\pi = \frac{x}{360}\cdot\pi(2)^2$ $\pi = \frac{4\pi x}{360}$ $360\pi = 4\pi x$ $90 = x$

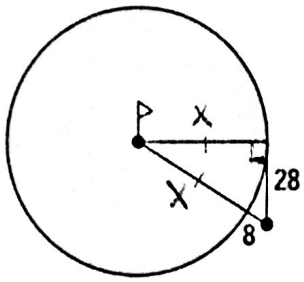
Arc length $\frac{90}{360}\cdot 2\pi(2) = 3.14$

22. What is the radius of a circle (in degrees) if the length of a 45° arc is 3π?

Arc length: $3\pi = \frac{45}{360}\cdot 2\pi r$ $3\pi = \frac{90\pi r}{360}$ $12\pi = \pi r$ $12 = r$

Applications.

23. A green on a golf course is in the shape of a circle. A golf ball is 8 feet from the edge of the green and 28 feet from a point of tangency as shown. Assume that the green is flat.



a. What is the radius of the green? 45 feet

b. How far is the golf ball from the cup/hole at the center of the green?

$x+8 = 45+8 = 53$ feet

$x^2 + 28^2 = (x+8)^2$

$x^2 + 784 = x^2 + 16x + 64$

$-x^2 \quad -64 \quad -x^2 \quad -64$

$720 = 16x$

$45 = x$

24. On a certain vehicle, one windshield wiper is 60 cm long, and is afixed to a swing arm which is 72 cm long from pivot point to wiper-blade tip. If the swing arm turns through 105°, what area of the windshield, to the nearest square centimeter, is swept by the wiper blade? Draw a Picture. (Hint: Large circle has radius 72, Small circle has radius 12).

Large sector Area − Small sector Area

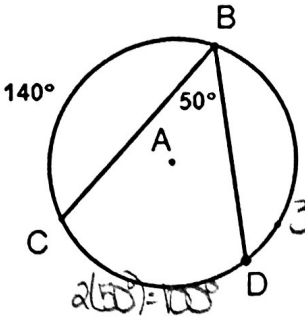
$\frac{105}{360}\cdot\pi(72)^2 - \frac{105}{360}\cdot\pi(12)^2$

$= 4750.09 - 131.95$

$= 4618.14\,cm^2$

Multiple Choice:

25. Find the measure of $\widehat{BD}$

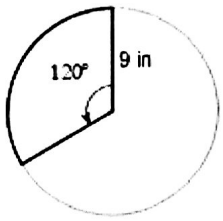


a. 140°
b. 100°
c. 170°
d. 120°

$360° - (140° + 100°) = 120°$

$2(50°) = 100°$

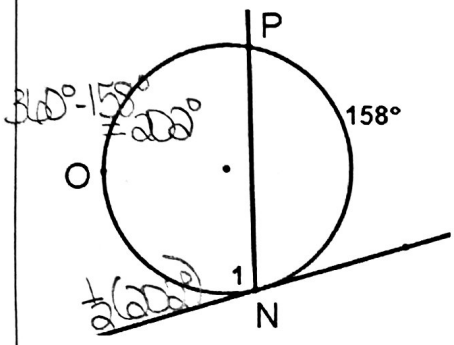
26. Find the area of the shaded region.



a. $763.4\ ft.^2$
b. $84.8\ ft.^2$ * in^2
c. $18.8\ ft.^2$
d. $169.6\ ft.^2$

$\frac{120}{360} \cdot \pi(9)^2$

27. Find $m\angle 1$.

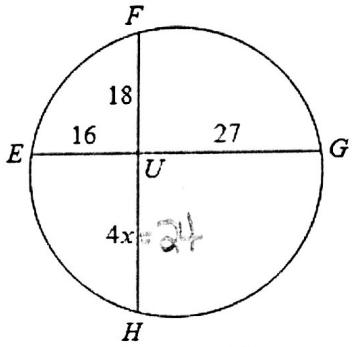


a. 158°
b. 79°
c. 101°
d. 202°

$360° - 158° = 202°$

$\frac{1}{2}(202°)$

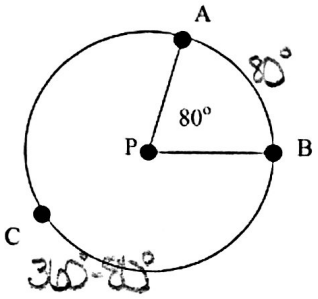
28. Find the length of segment *FH*.



A) 26
B) 42
C) 58
D) 43

$16(27) = 4x(18)$
$432 = 72x$
$6 = x$

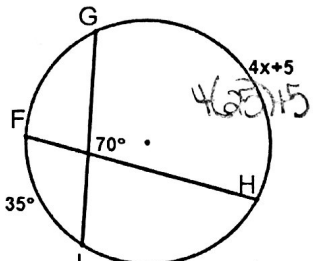
29. What is the measure of arc ACB?



a. 280°
b. 200°
c. 160°
d. 80°

$360° - 80°$

30. Find $m\widehat{GH}$.



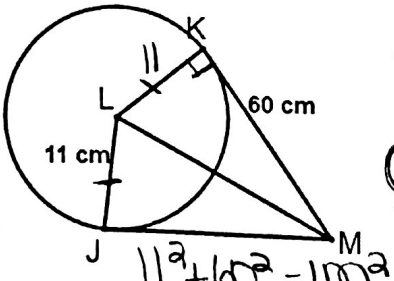
a. 25°
b. 35°
c. 70°
d. 105°

$4(25) + 5$

$70° = \frac{1}{2}(35 + 4x + 5)°$

$140° = 4x + 40°$ $x = 25°$

31. If $\overline{KM}$ and $\overline{JM}$ are tangent to circle L. What is the length of $\overline{LM}$.

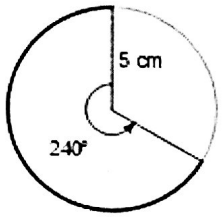


a. 11 cm
b. 59 cm
c. 60 cm
d. 61 cm

$11^2 + 60^2 = LM^2$

$3721 = LM^2$

32. Find the arc length.



a. $52.4m$
b. $20.9m$ * cm
c. $117.8m$
d. $47.1m$

$\frac{240}{360} \cdot 2\pi(5)$