Unit 10 Practice Exam (PE#6)
Circles

bit.ly/robinson-pe6

Name: Answer Key
Date: _____ **Per:** _____

Show ALL work and BOX answers to receive credit. Use the π button. Round to 2 decimal places.

1. Match each part of the circle with the correct vocabulary term:

central angle	***chord***	***diameter***	***inscribed angle***
major arc	***minor arc***	***radius***	***tangent line***

a) $\overleftrightarrow{XY}$ = tangent line

b) $\angle RZQ$ = central angle

c) $\overline{PR}$ = chord

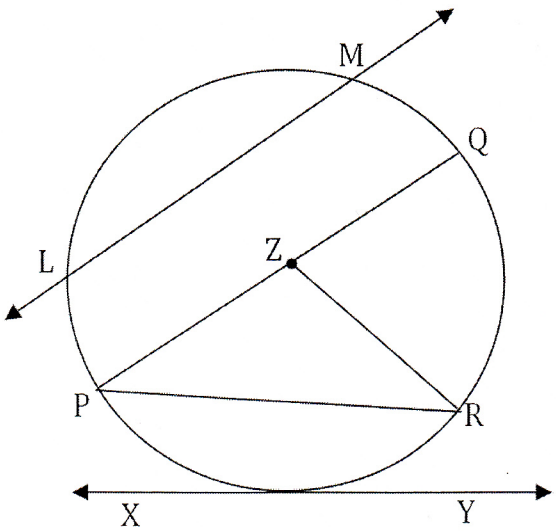
d) $\overline{PQ}$ = diameter

e) $\overset{\frown}{LM}$ = minor arc

f) $\overline{ZP}$ = radius

g) $\angle QPR$ = inscribed angle

h) $\overset{\frown}{MRP}$ = major arc



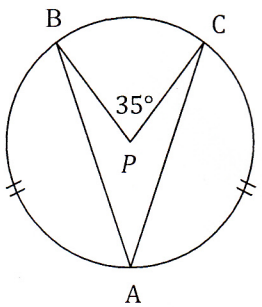
2. Given the information in the diagram of circle P at right, find $m\overset{\frown}{BC}$, $m\angle BAC$, and $m\overset{\frown}{AB}$.

$m\overset{\frown}{BC} + m\overset{\frown}{AB} + m\overset{\frown}{AC} = 360°$, $m\overset{\frown}{AB} = m\overset{\frown}{AC}$

$35° + x + x = 360°$

$2x = 325°$

$x = 162.5°$



$m\overset{\frown}{BC}$ = 35° $m\angle BAC$ = 17.5° $m\overset{\frown}{AB}$ = 162.5°

3. In the circle at right, the diameter $\overline{KL}$ intersects $\overline{MP}$ at point Q. If $\overline{QP} = 6$, $\overline{QM} = 7$, and $\overline{QL} = 5$, then what is the radius and circumference of the circle?

$5x = (7)(6)$

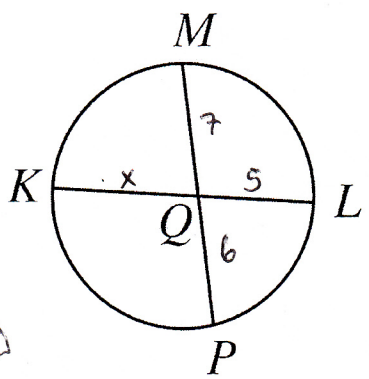
$5x = 42$

$x = 8.4$

$r = \frac{5 + 8.4}{2} = \frac{13.4}{2} = 6.7$

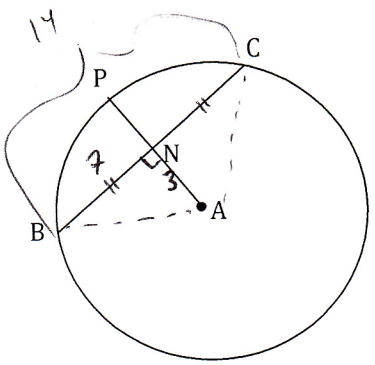
$C = 2\pi r = 2\pi(6.7) = 13.4\pi$

≈ 42.10 units



Radius = 6.7 units Circumference = 42.10 units

4. Radius $\overline{PA}$ bisects chord $\overline{BC}$, $\overline{BC} = 14$, and $\overline{AN} = 3$.
Find $\overline{PN}$ and the Area of the circle.



$r = \overline{AB} = \sqrt{(3)^2 + (7)^2}$ ← Pythagorean Theorem

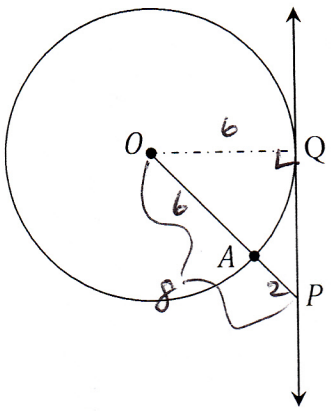
$= \sqrt{9+49} = \sqrt{58} = \overline{AP}$

$\overline{PN} = \overline{AP} - \overline{AN} = \sqrt{58} - 3 \approx 4.62$

$A = \pi r^2 = \pi(\sqrt{58})^2 = 58\pi \approx 182.21$

$\overline{PN}$ = 4.62 units Area = 182.21 u^2

5. In circle O, $\overline{QP}$ is tangent at point Q, $\overline{OA} = 6$ and $\overline{AP} = 2$.
What is the length of $\overline{QP}$? What is the central angle $m\angle AOQ$?



$a^2 + b^2 = c^2$

$b^2 = c^2 - a^2$

$b = \sqrt{c^2 - a^2}$

$\cos(m\angle AOQ) = \frac{6}{8}$

$m\angle AOQ = \cos^{-1}\left(\frac{3}{4}\right)$

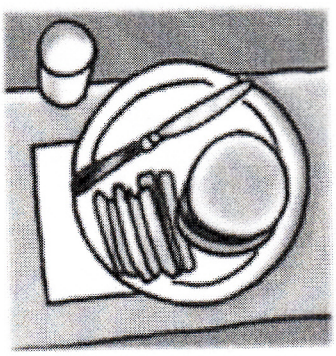
$m\angle AOQ \approx 41.41°$

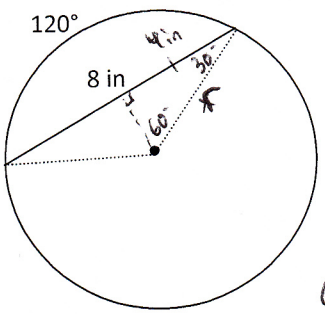
$\overline{QP} = \sqrt{(\overline{OP})^2 - (\overline{OQ})^2}$

$\overline{QP} = \sqrt{(8)^2 - (6)^2} = \sqrt{64-36} = \sqrt{28} = 2\sqrt{7}$

$\overline{QP}$ = 5.29 units $m\angle AOQ$ = 41.41°

6. An 8-inch dinner knife is sitting on a circular plate so that its ends are on the edge of the plate. If the minor arc that is intercepted by the knife measures 120°, find the diameter of the plate. Show all work.





$\sin(60°) = \frac{4}{r}$ ← radius

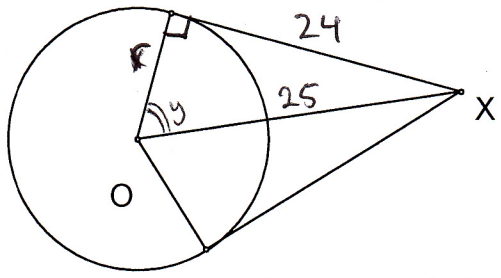
$r = \frac{4}{\sin(60°)}$

$d = 2r = \frac{2(4)}{\sin(60°)} = \frac{8}{\sin(60°)} \approx 9.24$ in

7. $\overline{XA}$ and $\overline{XB}$ are tangent segments of circle O. If $\overline{XA} = 24$ and $\overline{XO} = 25$, then find:

A

a. The radius, $\overline{OA}$ = r



$r^2 + (24)^2 = (25)^2$ ...

$r = 7$ units

b. Length of $\overset{\frown}{AB}$

B

$\sin(y) = \frac{24}{25}$ $\quad y = \sin^{-1}\left(\frac{24}{25}\right)$

$2y = 2\sin^{-1}\left(\frac{24}{25}\right) \approx 73.74°$

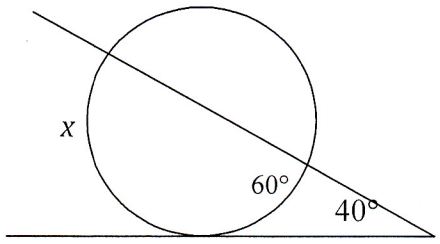
$C = 2\pi r = 2\pi(7) = 14\pi$

$\frac{73.74°}{360°} = \frac{\overset{\frown}{AB}}{14\pi}$ → $360\,\overset{\frown}{AB} = 3243.25$

$\overset{\frown}{AB} \approx 9.01$ units

8. Find the value of x in each figure below.

a.

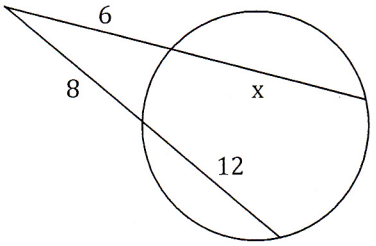


$x = \frac{1}{2}(b - a)$

$40° = \frac{1}{2}(x - 60°)$

$80° = x - 60°$ → $x = 140°$

b.



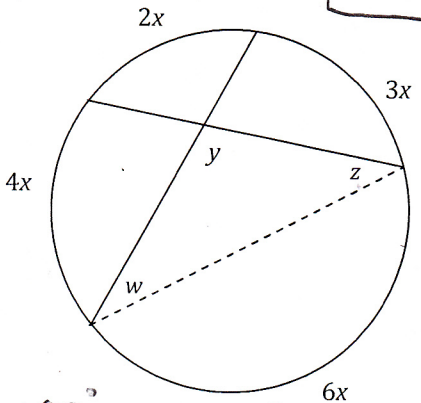
$a(a+b) = c(c+d)$

$6(6+x) = 8(8+12)$

$36 + 6x = 160$

$6x = 124$ → $x \approx 20.67$ u

9. Find the value of x and y in the circle at right:



$2x + 3x + 6x + 4x = 360°$

$15x = 360°$

$x = 24°$

$\frac{2x + 6x}{2} = y = \frac{2(24°) + 6(24°)}{2} = \frac{48° + 144°}{2} = \frac{192°}{2} = 96°$

(or solve for inscribed $\angle$'s w & y, then subtract those values from 180°)

10. In the diagram of circle O below, assume $m\overset{\frown}{AE} = 50°$ and $m\overset{\frown}{AC} = 120°$. Find:

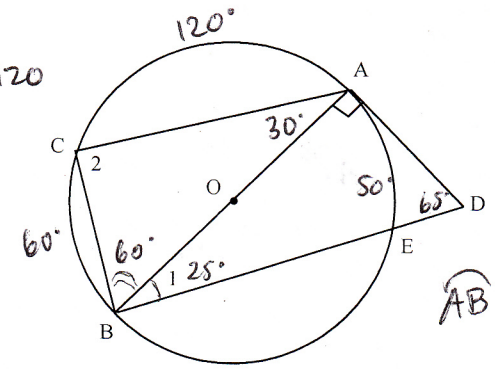
a) $m\angle 1 = \frac{50}{2} = 25°$

b) $m\overset{\frown}{BE} = 180 - 50 = 130°$

c) $m\angle 2 = 180 - (60+30) = 180 - 90 = 90°$

d) $m\overset{\frown}{CB} = 180 - 120 = 60°$

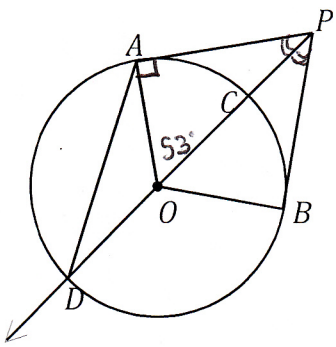
e) $m\angle CAB = \frac{60°}{2} = 30°$



$\angle D = 180 - (90+25) = 180 - 115 = 65$

$\overset{\frown}{AB} = 180°$

11. In circle O, $\overline{PA}$ and $\overline{PB}$ are tangents. $\overrightarrow{PD}$ bisects $\angle BPA$. If $m\angle AOP = 53°$, find the measure of $m\angle APO$, $m\overset{\frown}{AC}$, and $m\angle ADC$

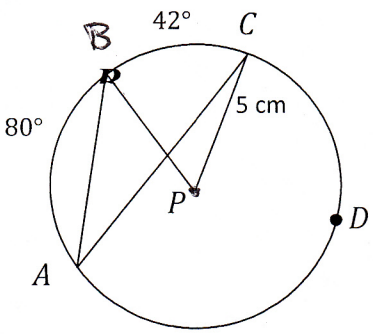


$m\angle APO = 90 - 53 = 37°$

$m\overset{\frown}{AC} = 53°$

$m\angle ADC = \frac{53}{2} = 26.5°$

12. Given the information in the diagram of circle P at right, ~~below,~~ find $m\angle A$, $m\overset{\frown}{ADC}$, $m\angle P$, length of $\overset{\frown}{BC}$ and the Area of Circle P



a) $m\angle A = 21°$ — $m\angle A = \frac{42°}{2} = 21°$

b) $m\overset{\frown}{ADC} = 238°$ — $m\overset{\frown}{ADC} = 360 - (80+42) = 360 - 122 = 238°$

c) $m\angle P = 42°$

d) LENGTH $\overset{\frown}{BC} = 3.67$ cm

$C = 2\pi r = 2\pi(5) = 10\pi$ cm

$\frac{42°}{360°} = \frac{\overset{\frown}{BC}}{10\pi}$

$\frac{7}{60} = \frac{\overset{\frown}{BC}}{10\pi}$

$70\pi = 60\,\overset{\frown}{BC}$

$\overset{\frown}{BC} = \frac{70\pi}{60} \approx 3.67$ cm

e) Area of Circle P = $78.54\ cm^2$

$A = \pi r^2 = \pi(5)^2 = 25\pi \approx 78.54\ cm^2$