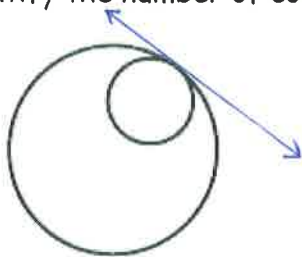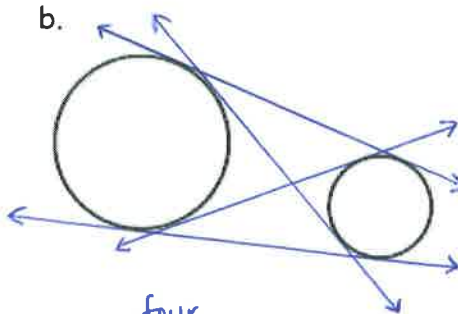1. Identify the number of common tangents for the following pairs of circles.

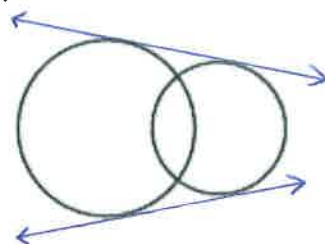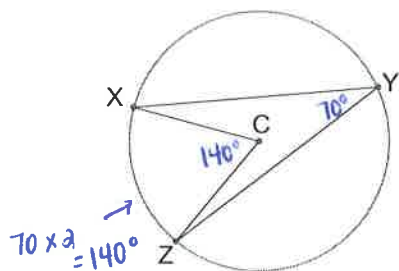   a.

   b.

   c.

   one   four   two
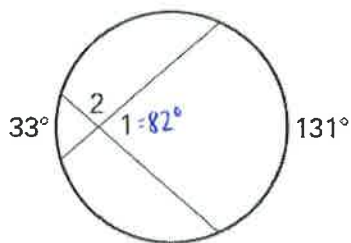
2. If the measure of $\angle XYZ = 70°$ in $\odot C$, find the measure of $\angle XCZ$.

   ↓
   central angle
   (same as its arc $\overparen{XZ}$)

   X
   C
   140°
   70°
   Y

   $70 \times 2 = 140°$ Z

   $\boxed{m\angle XCZ = 140°}$

3. Find the measure of $\angle 2$.

   33°
   2
   1=82°
   131°

   $m\angle 1 = \frac{1}{2}(33+131)$

   $m\angle 1 = \frac{1}{2}(164)$

   $m\angle 1 = 82°$

   $m\angle 2 + 82 = 180$ ← Linear pair

   $\boxed{m\angle 2 = 98°}$

4. Please find the value of x.

   45°
   $x°$
   $360-x$
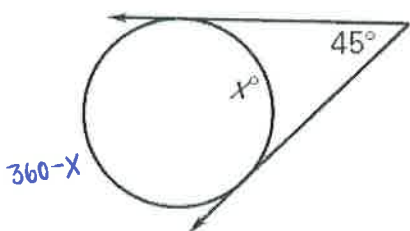
   $45 = \frac{1}{2}(360-x-x)$

   $45 = \frac{1}{2}(360-2x)$

   $45 = 180-x$

   $-135 = -x$

   $\boxed{x = 135°}$

5. Please find the value of x.

$x+3$

3

4

x

7

$7+4=11$
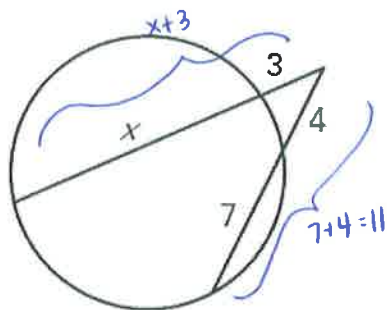
out·whole = out·whole

$3(3+x) = 4(11)$

$9+3x = 44$

$3x = 35$

$$x = 11.67$$

6. Do the following points fall on the circle with equation $(x-2)^2 + (y-6)^2 = 25$?

a. $(2,6)$

$(2-2)^2 + (6-6)^2 \overset{?}{=} 25$

$(0)^2 + (0)^2 \overset{?}{=} 25$

$0 \neq 25$

No

b. $(5,10)$

$(5-2)^2 + (10-6)^2 \overset{?}{=} 25$

$(3)^2 + (4)^2 \overset{?}{=} 25$

$9+16 \overset{?}{=} 25$

$25 = 25$

Yes

c. $(4,2)$

$(4-2)^2 + (2-6)^2 \overset{?}{=} 25$

$(2)^2 + (-4)^2 \overset{?}{=} 25$

$4+16 \overset{?}{=} 25$

$20 \neq 25$

No

d. $(6,9)$

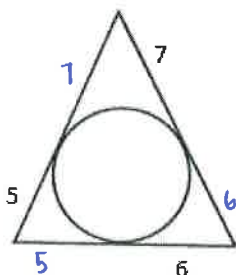$(6-2)^2 + (9-6)^2 \overset{?}{=} 25$

$(4)^2 + (3)^2 \overset{?}{=} 25$

$16+9 \overset{?}{=} 25$

$25 = 25$

Yes

7. Find the perimeter of the circumscribed triangle.

7

7

5

6

5

6

$P = 7+7+6+6+5+5$

$$P = 36 \text{ units}$$

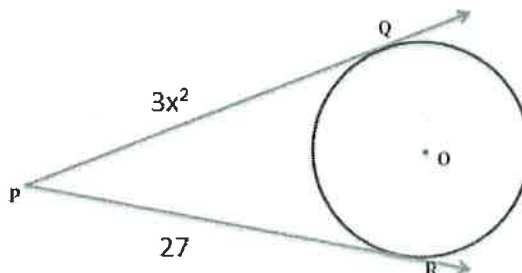8. Given that Q and R are both points of tangency, please solve for x.

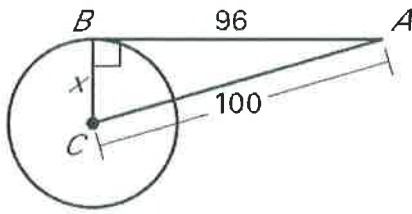$\frac{\cancel{3}x^2}{\cancel{3}} = \frac{27}{3}$

$x^2 = 9$

$x = \sqrt{9}$

$$x = 3 \text{ or } x = -3$$

↑ because $3(-3)^2 = 3(9) = 27$

$3x^2$

Q

• O

P

27

R

9. Given that $\overline{AB}$ is tangent to $\odot C$, please find the radius CB.
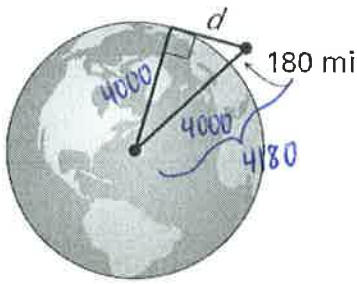
B   96   A

x

100

C

$x^2 + 96^2 = 100^2$

$x^2 + 9216 = 10000$

$x^2 = 784$

$x = 28$

$\boxed{CB = 28}$

10. Suppose a space shuttle is orbiting about 180 miles above Earth. What is the distance d from the shuttle to the horizon? The radius of Earth is about 4000 miles. Round your answer to the nearest tenth.
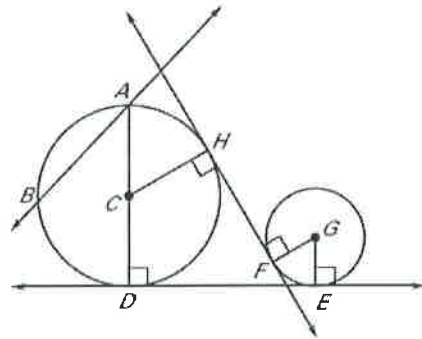
d

4000

180 mi

4000

4180

$d^2 + 4000^2 = 4180^2$

$d^2 + 16000000 = 17472400$

$d^2 = 1472400$

$\boxed{d = 1213.4 \text{ mi}}$

11. Match the notation with the term that best describes it.

Point of Tangency **a.** D

Common Int. Tangent **b.** $\overleftrightarrow{FH}$

Radius **c.** $\overline{CD}$

Chord **d.** $\overline{AB}$

Center **e.** C

Diameter **f.** $\overline{AD}$

Secant **g.** $\overleftrightarrow{AB}$

Common Ext. Tangent **h.** $\overleftrightarrow{DE}$

A. Center

B. Chord

C. Diameter

D. Radius

E. Point of tangency

F. Common external tangent

G. Common internal tangent

H. Secant

12. Find the indicated measures in $\odot M$.
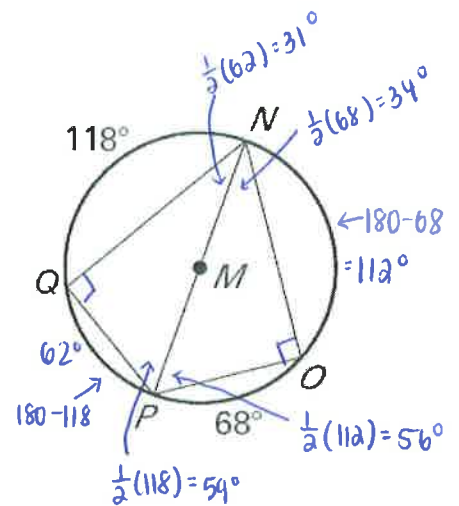
a. $\angle PNQ = \frac{1}{2}(62) = \boxed{31°}$

c. $\angle QPO = 59+56$
$= \boxed{115°}$

b. $\widehat{PNQ}$
$= 68+112+118$
$= \boxed{298°}$

d. $\angle PON = \boxed{90°}$
(inscribed to a semicircle)

$\frac{1}{2}(62)=31°$

$118°$ N $\frac{1}{2}(68)=34°$

$\leftarrow 180-68$
$=112°$

Q $\bullet M$

$62°$

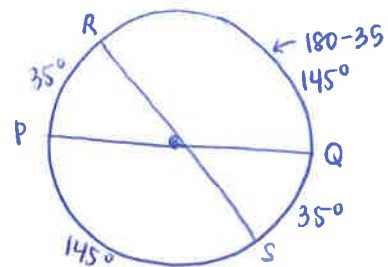$180-118$ P $68°$ $\frac{1}{2}(112)=56°$ O

$\frac{1}{2}(118)=59°$

13. Two diameters of $\odot T$ are $\overline{PQ}$ and $\overline{RS}$. Find the given arc measure if $m\widehat{PR} = 35°$.
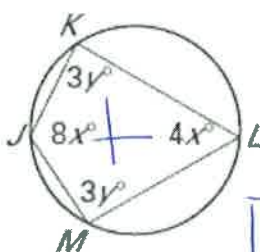
a. $m\widehat{PS} = \underline{145°}$ b. $m\widehat{PSR} = 145+35+145 = 325°$

c. $m\widehat{PRQ} = \underline{180°}$ d. $m\widehat{PRS} = 35+145+35 = 215°$
   ↑
semicircle

R

$35°$ $\leftarrow 180-35$
        $145°$

P Q

              $35°$
$145°$ S

14. Find the measure of each angle inside the inscribed polygon.

$3y+3y = 180$ $8x+4x = 180$
$6y = 180$ $12x = 180$
$\boxed{y=30}$ $\boxed{x=15}$

K
$3y°$
J $8x°$ ─── $4x°$ L
$3y°$
M

$m\angle K = 3(30) = 90°$
$m\angle J = 8(15) = 120°$
$m\angle M = 3(30) = 90°$
$m\angle L = 4(15) = 60°$

15. Please find the $m\angle PQR$.

P

$(5x+60)°$

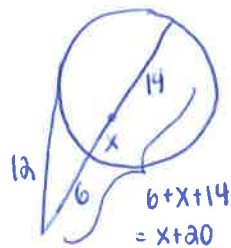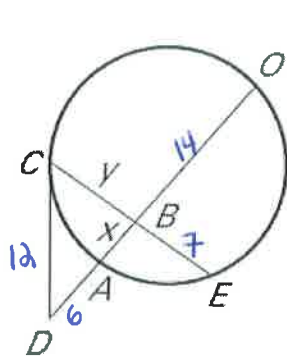R

Q
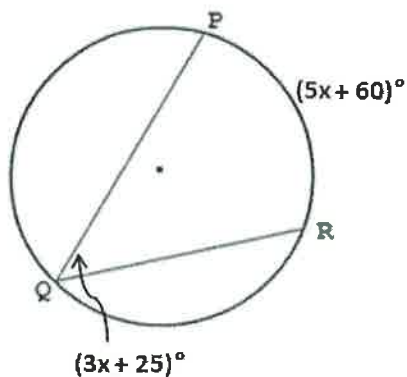
$(3x+25)°$

$2(3x+25) = 5x+60$
$6x+50 = 5x+60$
$x+50 = 60$
$\boxed{x=10}$

$m\angle PQR = 3(10)+25$
$m\angle PQR = 30+25$
$\boxed{m\angle PQR = 55°}$

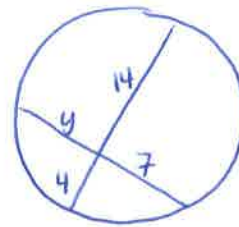16. In the diagram below, $BE = 7$, $BO = 14$, $AD = 6$, and $CD = 12$. Find the values of x and y.

$(14)(4) = (y)(7)$

$56 = 7y$

$\boxed{y = 8}$

$6 + x + 14$

$= x + 20$

$(12)(12) = 6(x + 20)$

$144 = 6x + 120$

$24 = 6x$

$\boxed{x = 4}$

17. Prove or disprove whether or not the point $(\overset{x}{1}, \overset{y}{8})$ lies on the circle $(x + 2)^2 + (y + 4)^2 = 25$.

$(1+2)^2 + (8+4)^2 \overset{?}{=} 25$

$(3)^2 + (12)^2 \overset{?}{=} 25$

$9 + 144 \overset{?}{=} 25$

$153 \neq 25$ $\boxed{(1,8) \text{ is } \underline{not} \text{ on the circle}}$

18. Jamie is designing a park and wants to include a carousel. On a blueprint, suppose that the center of the carousel is at the origin and that one of the railings on the circumference of the carousel has coordinates $(3, 4)$.

   a. If one unit on the coordinate plane is equivalent to 1 foot, find the diameter of the carousel.

   center at $(0,0)$ > radius $= \sqrt{(3-0)^2 + (4-0)^2} = \sqrt{(3)^2 + (4)^2} = \sqrt{9+16} = \sqrt{25} = 5$

   point at $(3,4)$

   diameter $= 2 \times 5 = \boxed{10 \text{ ft}}$

   b. Write an equation to represent the circular path the carousel follows as it spins.

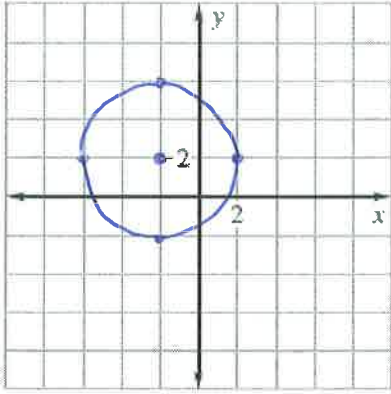   Center: $(0,0)$ $\Rightarrow$ $(x-0)^2 + (y-0)^2 = 5^2$

   radius $= 5$ $\boxed{x^2 + y^2 = 25}$

19. Graph the circles given the following equations.

a. $(x + 2)^2 + (y - 2)^2 = 16$ center $= (-2, 2)$
radius $= \sqrt{16} = 4$

b. $(x - 5)^2 + (y + 1)^2 = 4$ center $= (5, -1)$
radius $= \sqrt{4} = 2$