1. Identify each line or segment that intersects $\odot Q$.
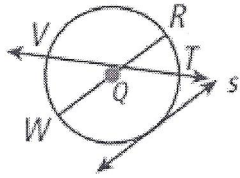
Chord(s): $\overline{WR}, \overline{VT}$
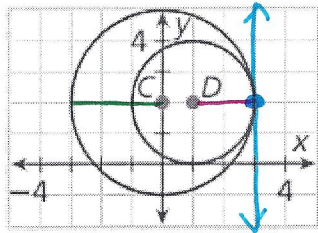
Secant(s): $\overleftrightarrow{VT}$

Radii: $\overline{QR}, \overline{QW}$
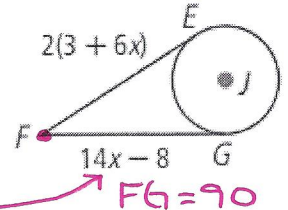
Tangent(s): line S

Diameter(s): $\overline{WR}$

2. Find the length of each radius. Identify the point of tangency and write the equation of the tangent line at this point.

$\odot D \rightarrow r = 2$
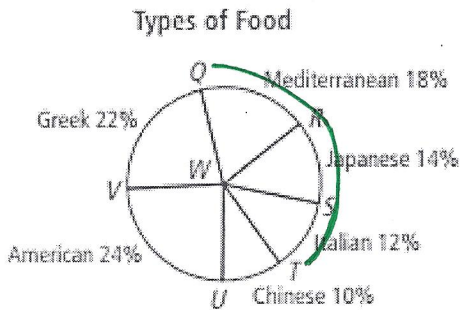$\odot C \rightarrow r = 3$
$PoT = (3, 2)$
$X = 3$

3. $\overline{FE}$ and $\overline{FG}$ are tangent to $\odot F$. Find FG.

$FE \cong FG$
$2(3+6x) = 14x - 8$
$6 + 12x = 14x - 8$
$14 = 2x$
$7 = x$

$2(3 + 6x)$
$14x - 8$
$FG = 90$

4. The circle graph shows the types of cuisine available in a city. Find the measure of arc TRQ.

Types of Food

Mediterranean 18%
Greek 22%
Japanese 14%
American 24%
Italian 12%
Chinese 10%

$\dfrac{x}{360} = \dfrac{44}{100}$

$100x = 15840$

$\boxed{X = 158.4°}$

5. Find each measure. Give answers in terms of π and rounded to the nearest hundredth.
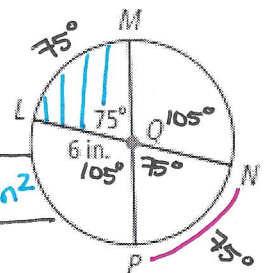
a) area of sector LQM

$Sector = \dfrac{arc}{360} \cdot \pi r^2$

$= \dfrac{75}{360} \cdot \pi (6)^2 = \boxed{\dfrac{15\pi}{2} \text{ or } 23.56 \text{ in}^2}$
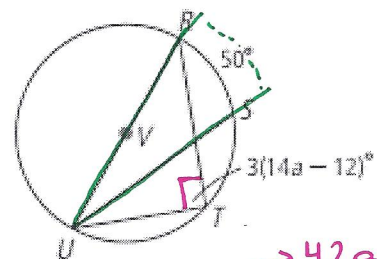
b) length of arc NP

$length = \dfrac{arc}{360} \cdot 2\pi r$

$= \dfrac{75}{360} \cdot 2\pi (6) = \boxed{\dfrac{5\pi}{2} \text{ in or } 7.85 \text{ in.}}$

6. Find each measure

a) $\angle RUS = \dfrac{1}{2} RS = \dfrac{1}{2}(50) = \boxed{25°}$

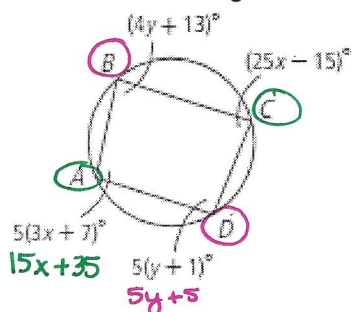b) a $\angle T$ is $90°$ bc $\overline{RU}$ is diameter

$3(14a - 12) = 90 \rightarrow 42a - 36 = 90$

$\rightarrow 42a = 126$

$\boxed{a = 3}$

$3(14a - 12)°$

$50°$

7. The gear of a grandfather clock has a radius of 3 in. To the **nearest tenth** of an inch, what **distance** does the gear cover when it rotates through an angle of $88°$. *length*

$$length = \frac{arc}{360} \cdot 2\pi r = \frac{88}{360} \cdot 2\pi(3) = \frac{22\pi}{15} \text{ or } \boxed{4.6 \text{ in.}}$$
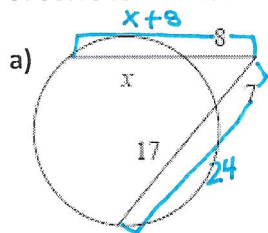
8. Find the angle measure of ABCD.

$(4y+13)°$
$(25x-15)°$
$5(3x+7)°$
$15x+35$
$5(y+1)°$
$5y+5$

$4y+13+5y+5=180$
$9y+18=180$
$9y=162$
$y=18$

$\boxed{\angle B=85° \quad \angle D=95°}$

$25x-15+15x+35=180$
$40x+20=180$
$40x=160$
$x=4$

$\boxed{\angle A=95°}$
$\boxed{\angle C=85°}$

9. Solve for x. Assume all lines that appear tangent are tangent.

a)
$x+8$
8
x
17
24
7

$w.o = w.o$
$(x+8)8 = 24 \cdot 7$
$8x+64 = 168$
$8x = 104$
$\boxed{x=13}$

b)
14
16
$x+2$
$x+3$
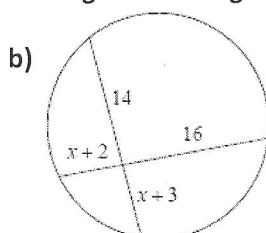
$p1 \cdot p2 = p1 \cdot p2$
$(x+2)16 = 14(x+3)$
$16x+32 = 14x+42$
$2x = 10$
$\boxed{x=5}$

c)
x
$x+32$
32
40
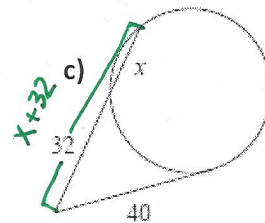
$\tan^2 = w.o$
$40^2 = (x+32)32$
$1600 = 32x+1024$
$576 = 32x$
$\boxed{18=x}$

10. Find the measure of the arc or angle indicated.

a)
P
outside $\angle$
Q
$240°$
B
R
$S = 360-240$
$120°$
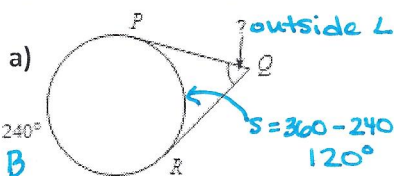
outside $\angle = \frac{1}{2}(B-s)$
$x = \frac{1}{2}(240-120)$
$\boxed{x=60°}$

b)
$226°$
V
U
$134°$
T
$360-226$

$\angle TUV = \frac{1}{2}(134)$
$\boxed{\angle TUV = 67°}$

c)
B
L
M
$79°$
Inside $\angle$
K
Q
$75°$
S
N
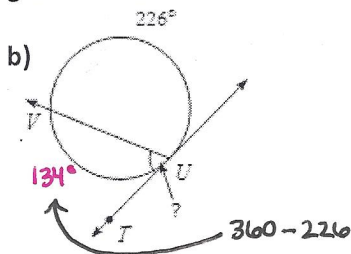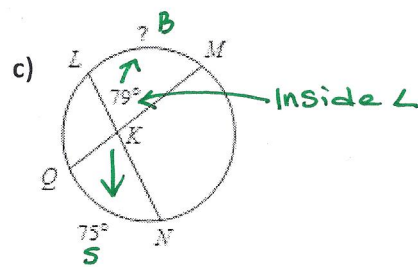
Inside $\angle = \frac{1}{2}(B+s)$
$2 \cdot 79 = \frac{1}{2}(x+75) \cdot 2$
$158 = x+75$
$\boxed{83° = x}$

11. Find ST. Assumes lines that appear tangent are tangent.

R
12
5
Q
S
S x T
$x+5$
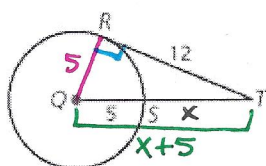
$QR \perp RT$ so right $\angle$.
$QR^2 + RT^2 = QT^2$
$5^2 + 12^2 = (x+5)^2$

$169 = (x+5)^2$ ← square root.
$13 = x+5$
$\boxed{8 = x}$