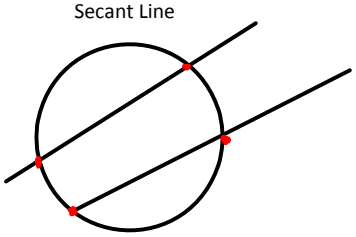
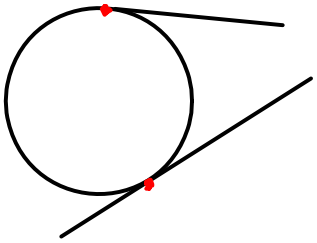
Secants, Tangents and Chords

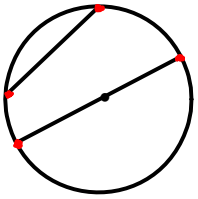
Secant Line



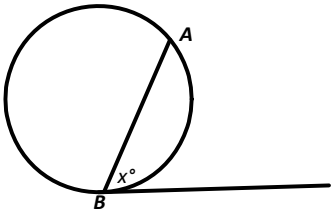
Tangent Line



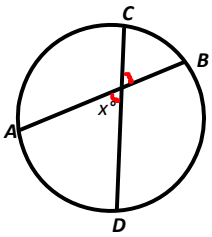
Chord



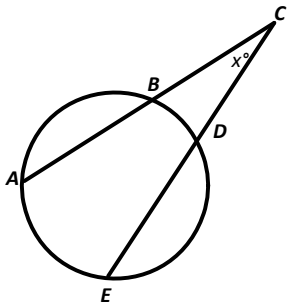
Angles formed by Secants, Tangents and Chords



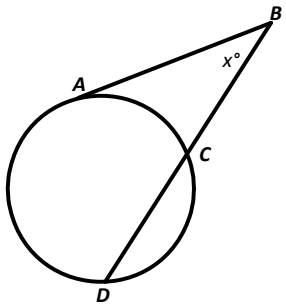
$$m\angle x^\circ = \frac{\overset{\frown}{AB}}{2}$$



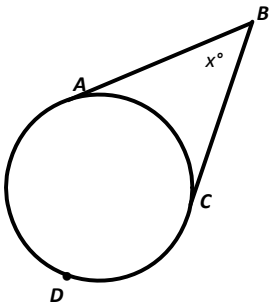
$$m\angle x^\circ = \frac{m\overset{\frown}{AD} + m\overset{\frown}{BC}}{2}$$



$$m\angle x^\circ = \frac{m\overset{\frown}{AE} - m\overset{\frown}{BD}}{2}$$



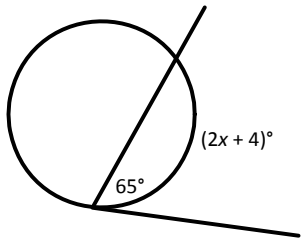
$$m\angle x^\circ = \frac{m\overset{\frown}{AD} - m\overset{\frown}{AC}}{2}$$



$$m\angle x^\circ = \frac{m\overset{\frown}{ADC} - m\overset{\frown}{AC}}{2}$$

1. Find the value of *x*.

a)



$\frac{65}{1} = \frac{2x+4}{2}$

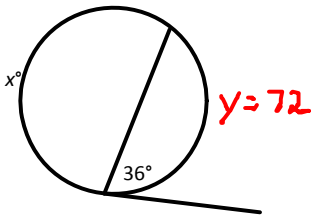
$2x + 4 = 130$

$-4 \quad -4$

$\frac{2x}{2} = \frac{126}{2}$

$x = 63°$

b)



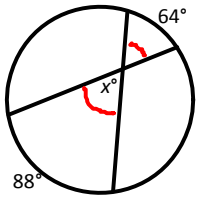
$\frac{36}{1} = \frac{y}{2}$

$y = 72$

$360 - 72 = 288$

$x = 288°$

c)

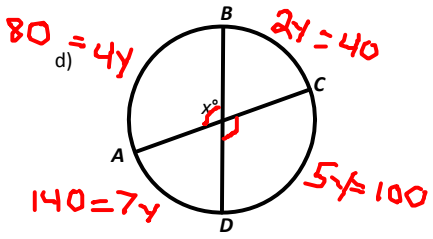


$x = \frac{88 + 64}{2}$

$x = \frac{152}{2}$

$x = 76$

d)



$80 = 4y$ $\quad 2y = 40$

$140 = 7y$ $\quad 5y = 100$

$\widehat{AB} : \widehat{BC} : \widehat{CD} : \widehat{DA} = 4 : 2 : 5 : 7$

$4y + 2y + 5y + 7y = 360°$

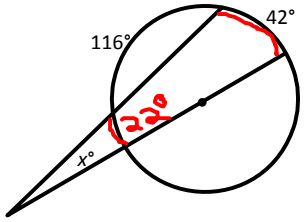
$\frac{18y}{18} = \frac{360°}{18}$

$y = 20$

$x = \frac{80 + 100}{2}$

$x = 90°$

e)



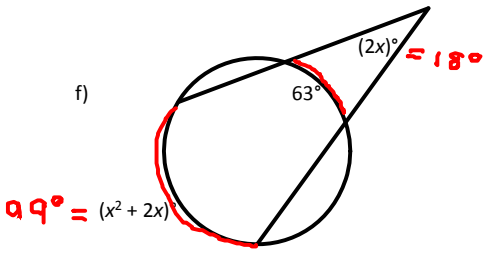
$116+42=158$

$180-158=22$

$x=\frac{42-22}{2}$

$\boxed{x=10°}$

f)



$2x=x^2+2x-63$

$x^2+2x-63=4x$

$-4x \quad -4x$

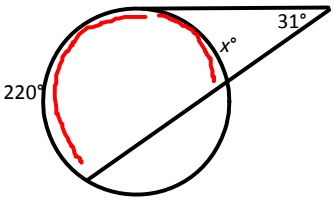
$x^2-2x-63=0$

$(x-9)(x+7)=0$

$x-9=0 \quad x+7=0$

$\boxed{x=9}$ $\quad x=-7$

g)



$31=220-x$

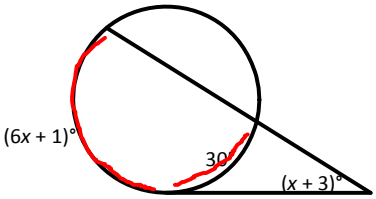
$220-x=62$

$-220 \quad -220$

$\frac{-x}{-1}=\frac{-158}{-1}$

$\boxed{x=158}$

h)



$x+3=6x+1-30$

$2(x+3)=6x+1-30$

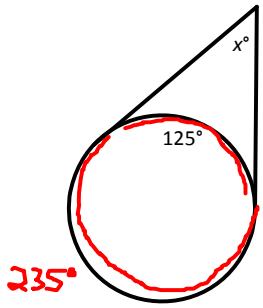
$2x+6=6x-29$

$-2x+29 \quad -2x+29$

$\frac{35}{4}=\frac{4x}{4}$

$\boxed{x=8.75°}$

i)



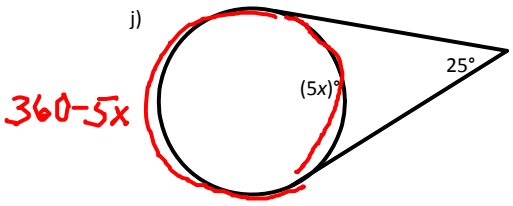
$360-125=235$

$x=\frac{235-125}{2}$

$x=\frac{110}{2}$

$\boxed{x=55^\circ}$

j)



$25=\frac{360-5x-5x}{2}$

$360-5x-5x=50$

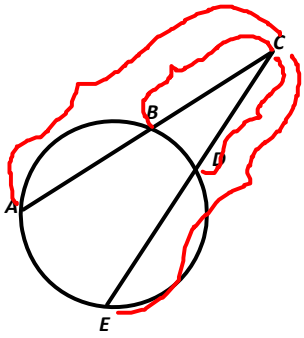
$360-10x=50$

$-360 \quad -360$

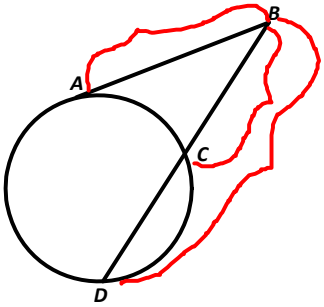
$-10x=-310$

$\boxed{x=31^\circ}$

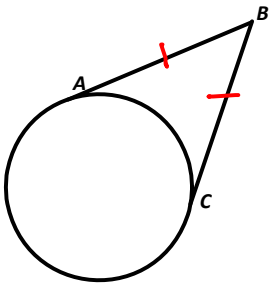
Segments formed by Secants, Tangents and Chords



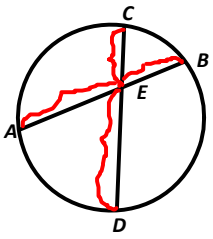
$CB \cdot CA = CD \cdot CE$



$AB \cdot AB = BC \cdot BD$



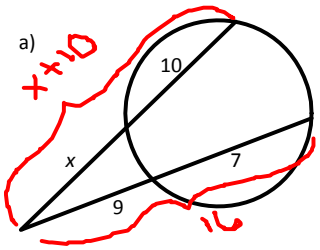
$AB = CB$



$AE \cdot EB = CE \cdot ED$

2. Find the value of *x*.

a)



$x(x+10)=9(16)$

$x^2+10x=144$

$-144 \quad -144$

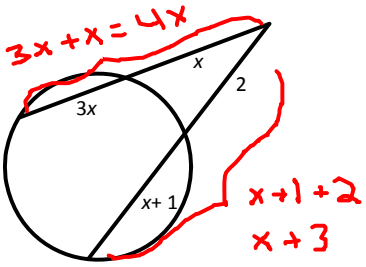
$x^2+10x-144=0$

$(x+18)(x-8)=0$

$x+18=0 \quad x-8=0$

$x=-18 \quad \boxed{x=8}$

b)



$x(4x)=2(x+3)$

$4x^2=2x+6$

$-2x-6$

$\frac{4x^2}{2}-\frac{2x}{2}-\frac{6}{2}=\frac{0}{2}$

$\frac{2x^2}{2\cdot1}-\frac{x}{}-\frac{3}{3\cdot1}=0$

$(2x-3)(x+1)=0$

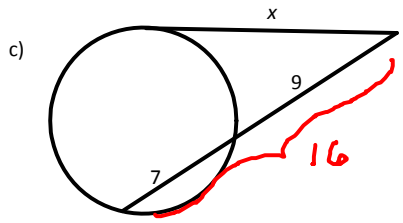
$2x-3=0 \quad x+1=0$

$+3 \quad +3$

$2x=3 \quad x=-1$

$\boxed{x=1.5}$

c)

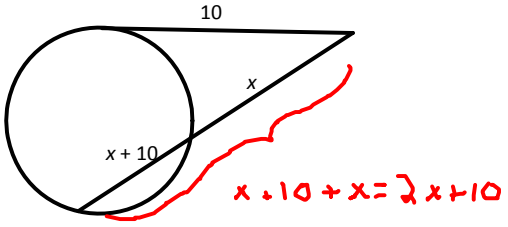


$x \cdot x=9(16)$

$x^2=144$

$\boxed{x=12}$

d)



$10 \cdot 10=x(2x+10)$

$100=2x^2+10x$

$-100 \quad -100$

$\frac{0}{2}=\frac{2x^2}{2}+\frac{10x}{2}-\frac{100}{2}$

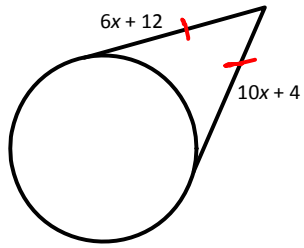
$0=x^2+5x-50$

$0=(x+10)(x-5)$

$x+10=0 \quad x-5=0$

$x=-10 \quad \boxed{x=5}$

e)



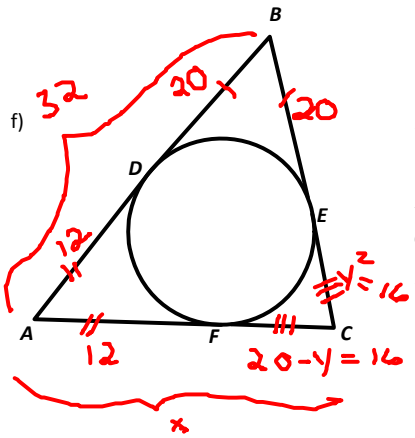
$6x+12=10x+4$

$-6x \quad -4 \quad -6x \quad -4$

$\frac{8}{-4} = \frac{-4x}{-4}$

$\boxed{-2 = x}$

f)



$AB = 32$

$BE = 20$

$EC = y^2$

$CF = 20 - y$

$AC = x$

$y^2 = 20 - y$

$-20 + y$

$y^2 + y - 20 = 0$

$(y+5)(y-4)=0$

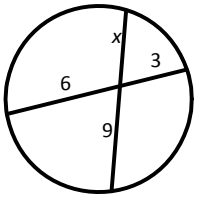
$y+5=0 \quad y-4=0$

$y=-5 \quad y=4$

$x = 12+16$

$\boxed{x=28}$

g)

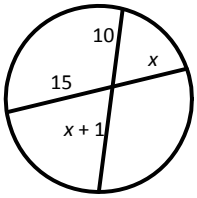


$x \cdot 9 = 6 \cdot 3$

$\frac{9x}{9} = \frac{18}{9}$

$\boxed{x=2}$

h)



$x \cdot 15 = 10 \cdot (x+1)$

$15x = 10x + 10$

$-10x \quad -10x$

$\frac{5x}{5} = \frac{10}{5}$

$\boxed{x=2}$