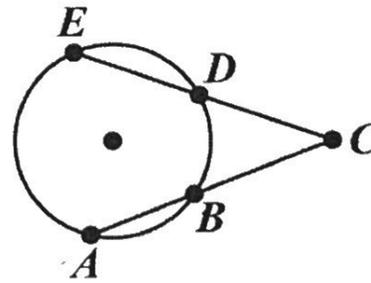


### Secant Segment Theorem

If two secant segments intersect in the exterior of a circle, then the product of the lengths of the secant segment and its external secant segment is equal to the product of the lengths of the second secant segment and its external secant segment.



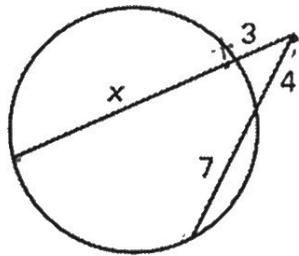
$$OW = OW$$

Outside \* Whole = Outside \* Whole

$$\overline{DC} (\overline{DC} + \overline{ED}) =$$

$$\overline{BC} (\overline{BC} + \overline{BA})$$

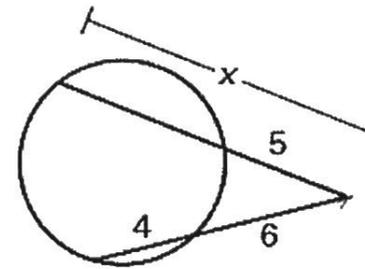
Example: Find x.



$$\begin{aligned} O.W &= O.W \\ 3(3+x) &= 4(4+7) \\ 9+3x &= 44 \\ -9 & \quad -9 \\ \hline 3x &= 35 \end{aligned}$$

$$\boxed{x = \frac{35}{3} \approx 11.67}$$

Example: Find x.



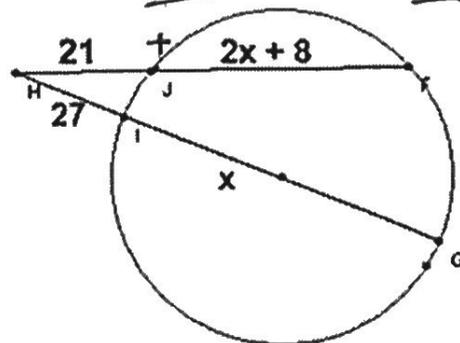
$$5(x) = 6(6+4)$$

$$5x = 36 + 24$$

$$5x = 60$$

$$\boxed{x = 12}$$

Example: Find x and then  $\underline{JF}$ .



$$m\angle JF = 2(8) + 8$$

$$\boxed{24}$$

$$21(21+2x+8) = 27(27+x)$$

$$21(2x+29) = 729 + 27x$$

$$\begin{aligned} 42x + 609 &= 729 + 27x \\ -27x & \quad -609 & -609 & \quad -27x \\ \hline 15x &= 120 \end{aligned}$$

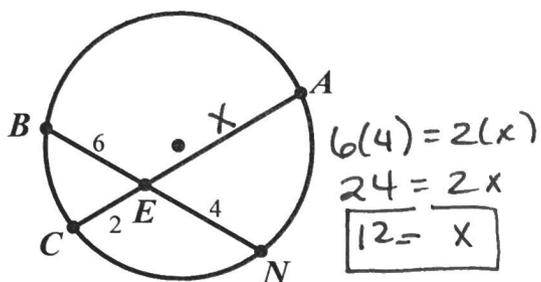
$$\frac{15x}{15} = \frac{120}{15}$$

$$\boxed{x = 8}$$

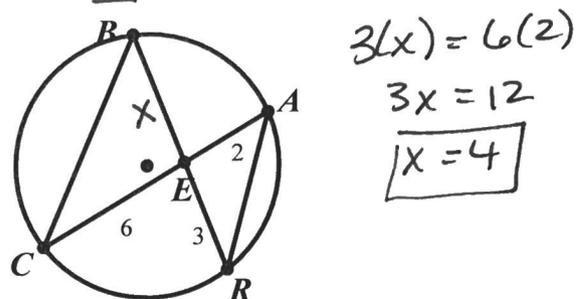


**Guided Practice:** Find the missing indicated segment in each of the following examples.

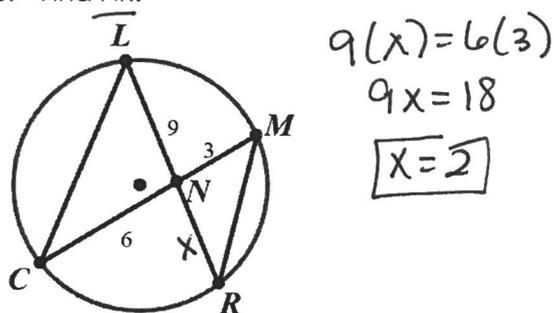
1. Find  $\overline{AE}$ .



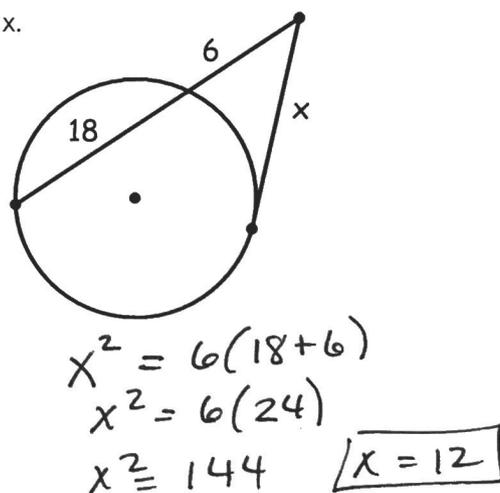
2. Find  $\overline{BE}$ .



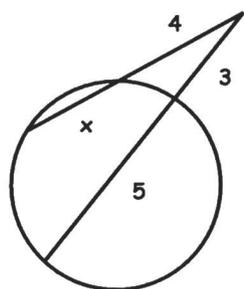
3. Find  $\overline{NR}$ .



4. Find  $x$ .

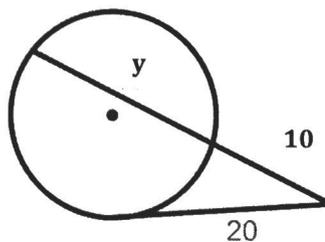


5. Find  $x$ .



$4(x+5) = 3(5+3)$   
 $4x+20 = 15+9$   
 $4x+20 = 24$   
 $\quad -20 \quad -20$   
 $\hline 4x = 4$   
 $\boxed{x = 1}$

6.



$10(y+10) = (20)^2$   
 $10y+100 = 400$   
 $\frac{10y}{10} = \frac{300}{10}$   
 $\boxed{y = 30}$