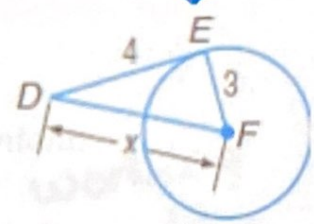
Tangents

Right ∠!

1. $\overline{ED}$ is tangent to Circle F at point E. Find *x*.

Review of content: • If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.

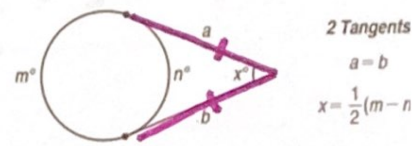


$3^2 + 4^2 = x^2$

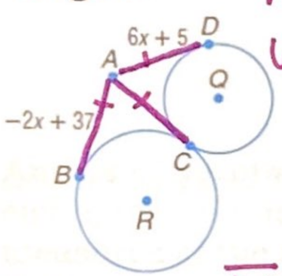
$\boxed{5 = x}$

2. Congruent Tangents

Review of content: • If two segments from the same exterior point are tangent to a circle, then they are congruent.



a. Find *AC*. Assume that segments that appear tangent to circles are tangent.



$\overline{AD} \cong \overline{AB}$

$6x + 5 = -2x + 37$

$8x + 5 = 37$

$8x = 32$

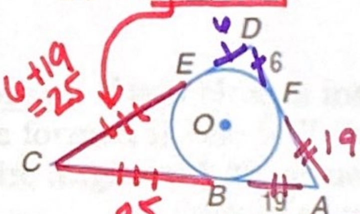
$x = 4$

$\overline{AC} \cong \overline{AB}$

$\overline{AC} = -2(4) + 37$

$AC = 29$ units

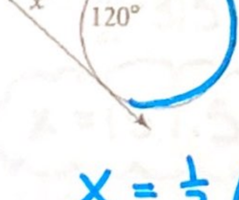
b. Triangle *ADC* is circumscribed (each segment is tangent to the circle) about Circle O. Find the perimeter of Triangle *ADC* if $\overline{EC} = \overline{DE} + \overline{AF}$.



Perimeter = 100 units

Two Tangents and Angles Conjecture: If two tangents intersect in the exterior of the circle then the measure of the angle formed is half the difference of the measures of the intercepted arcs.

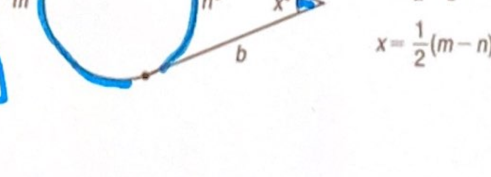
3. Find x.



to find this 360 − 120 = 240°

$\angle = \frac{1}{2}(\text{Big} - \text{little})$

Review of content:



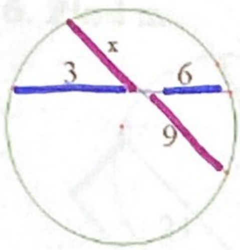
$x = \frac{1}{2}(240 - 120)$

$\boxed{x = 60°}$

Two Chords

Two Chord Interior Conjecture: If two chords intersect in the interior of a circle, then the **products** of the measures of the chord segments are equal.

4. Find x.

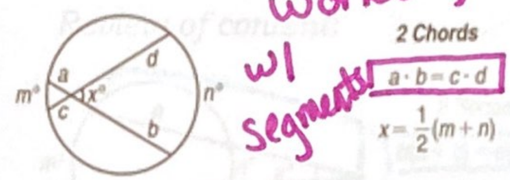


$9 \cdot x = 3 \cdot 6$

$9x = 18$

$\boxed{x = 2}$

Review of content:



working w/ segments

Angles of Intersecting Chords Theorem: If two chords intersect inside a circle, then the measure of each angle formed is one half the sum of the measures of the arcs intercepted by the angle and its vertical angle.

5. Find x.

Review of content:

Arcs + Angles!

$x = \frac{1}{2}(230 + 85)$

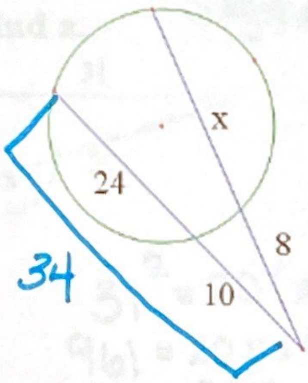
$x = \frac{1}{2} \cdot 315$

$x = 157.5$

Secants

Two Secants Exterior Conjecture: If 2 secants meet at an exterior point of the circle, then the product of the measures of the secant and the external secant is equal to the product of the other secant and the external secant.

6. Find x.



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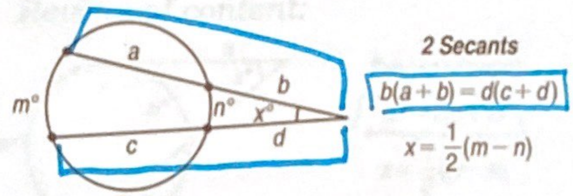


b(whole) = d(whole)

$8(x+8) = 10(34)$

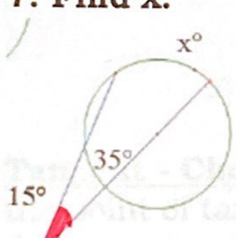
$8x + 64 = 340$

$8x = 276$

$\boxed{x = 34.5}$

Two Secants and Angles Conjecture: If two secants intersect in the exterior of the circle then the measure of the angle formed is half the difference of the measures of the intercepted arcs.

7. Find x.



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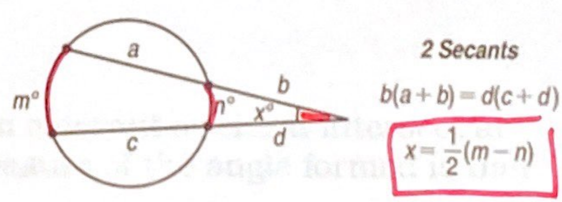


$< = \frac{1}{2}(\text{Big} - \text{little})$

$15 = \frac{1}{2}(x - 35)$

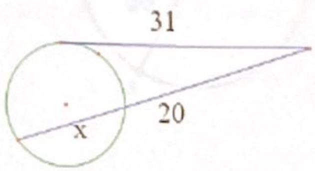
$30 = x - 35$

$\boxed{65° = x}$

Tangent and a Secants

Tangent & Secant Exterior Conjecture:
If a secant and tangent meet at an exterior point of the circle, then the product of the measures of the secant and the external secant is equal to the square of the tangent.

8. Find x. Segments!



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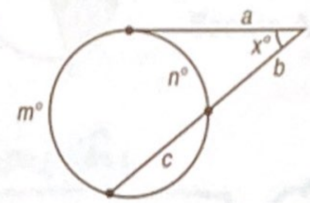


Tangent-Secant

$\boxed{a^2 = b(b+c)}$

$x = \frac{1}{2}(m-n)$

$31^2 = 20(x+20)$

$961 = 20x + 400$

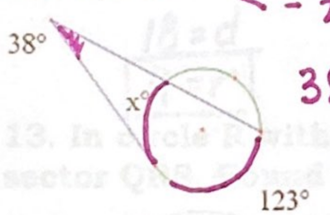
$561 = 20x$

$x = 28.05$

$a^2 = b\,(\text{whole})$

Exterior Tangent-Secant Angles Conjecture: If a tangent and a secant intersect in the exterior of the circle then the measure of the angle formed is half the difference of the measures of the intercepted arcs.

9. Find x. $\angle = \frac{1}{2}(\text{big} - \text{little})$



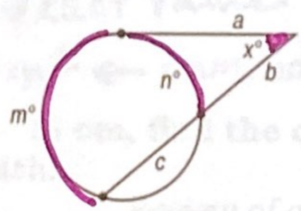
$38 = \frac{1}{2}(123 - x)$

$76 = 123 - x$

$-47 = -x$

$47° = x$

Review of content:



Tangent-Secant

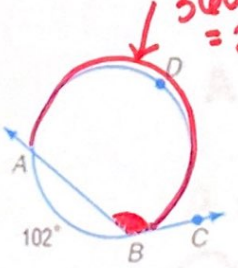
$a^2 = b(b+c)$

$x = \frac{1}{2}(m-n)$

Tangent - Chord Conjecture: If a tangent and a secant or chord intersect at the point of tangency of the circle then the measure of the angle formed is half the measure of the intercepted arc.

10. Find $m\angle ABC$.

$360 - 102$
$= 258$

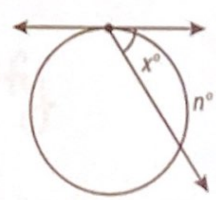


$\angle ABC = \frac{1}{2}\overset{\frown}{ADC}$

$\angle ABC = \frac{1}{2}\,258$

$\angle ABC = 129°$

Review of content:

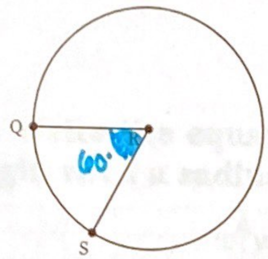


Tangent-Chord

$x = \frac{1}{2}n$

Arc Length and Sector Area (Review)

11. In circle R with $m\angle QRS = 60°$ and $QR = 6$ cm find the of arc length of QS. Round to the nearest hundredth.



$C = d\pi$ or $2\pi r$

$C = 12\pi$

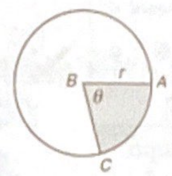
$L = \frac{60}{360} \cdot 12\pi$

$L = \frac{720\pi}{360}$ now simplify

$\boxed{L = 2\pi \text{ cm}}$ ← exact value this is the

$L \approx 6.28$ cm

Review of content:



Arc Length: $L = \frac{\theta}{360} C$

Sector Area: $A = \frac{\theta}{360} \pi r^2$

12. Find the area of a circle with circumference 18π m.

Review of content:
$A = \pi r^2$

$A = \pi r^2$ $\quad d = 2r$

$C = d\pi$

$18\pi = d\pi$

$18 = d$

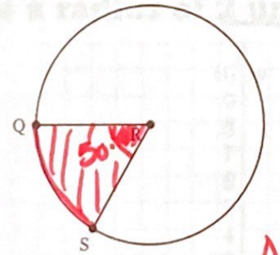
$\boxed{9 = r}$

$A = \pi 9^2$

$\boxed{A = 81\pi \text{ m}^2}$ exact value

$A \approx 254.469 \text{ m}^2$ ← rounded

13. In circle R with $m\angle QRS = 50°$ and $QR = 15$ cm, find the of area of the sector QRS. Round to the nearest hundredth.



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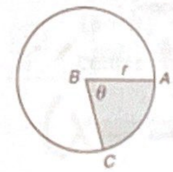


Arc Length: $L = \frac{\theta}{360} C$

Sector Area: $A = \frac{\theta}{360} \pi r^2$

$A = \frac{\theta}{360} \pi r^2$

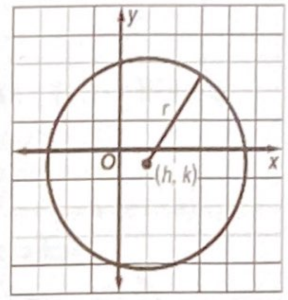
$A = \frac{50}{360} \pi 15^2$

$A = \frac{11250\pi}{360}$ Now Simplify

$A = \frac{125\pi}{4} \text{ cm}^2$ ← exact value

$A \approx 98.17 \text{ cm}^2$

Equation of a Circle A **circle** is the locus of points in a plane equidistant from a given point. You can use this definition to write an equation of a circle.

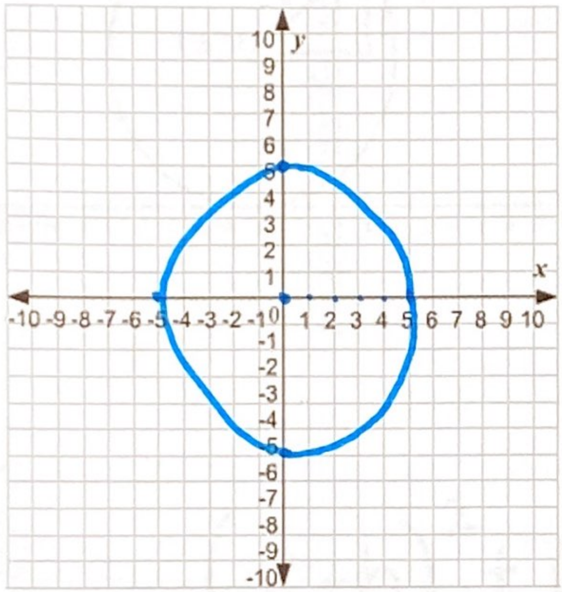


Standard Equation of a Circle	An equation for a circle with center at (h, k) and a radius of r units is $(x - h)^2 + (y - k)^2 = r^2$.

14. Write the equations and graph the circle with the centered at the origin with a radius of 5 units.

(0,0)
h, k
r=5

Review of content:
Equation of circle center at origin:
$x^2 + y^2 = r^2$ where r is the radius.



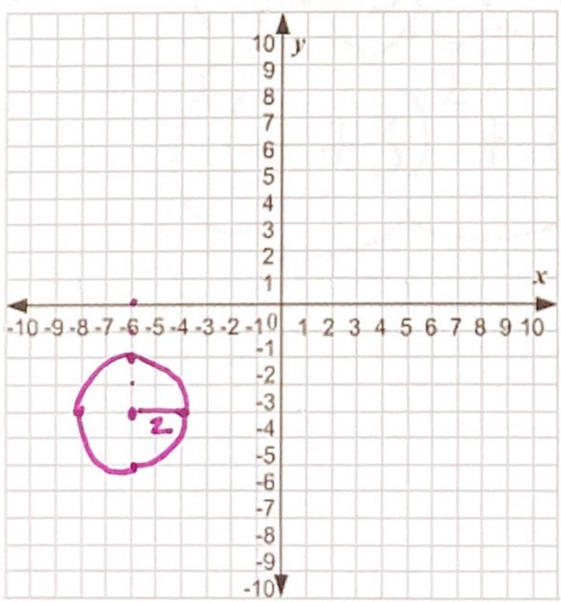
$x^2 + y^2 = 5^2$

$x^2 + y^2 = 25$

15. Write the equations and graph the circle with the center at $(-6, -4)$ and a radius of 2 units.

h k

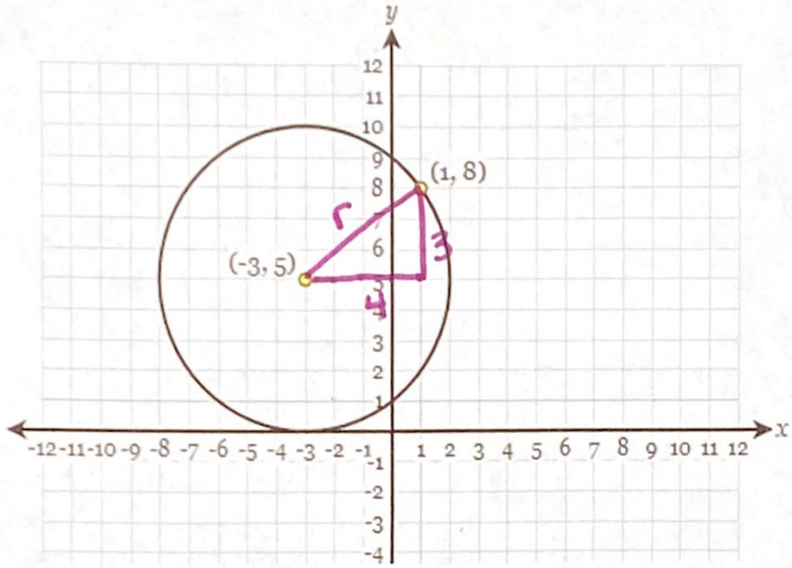
Review of content:
Equation of circle not at origin:
$(x-h)^2 + (y-k)^2 = r^2$ where (h,k) is the center and r is the radius.



$(x - -6)^2 + (y - -4) = 2^2$

$(x+6)^2 + (y+4)^2 = 4$

16. A circle with center at $(-3,5)$ has a radius with endpoint $(1,8)$. Write an equation for the circle.



Review of content:

Equation of circle not at origin: $(x-h)^2+(y-k)^2=r^2$ where (h,k) is the center and r is the radius.

$(h,k)=(-3,5)$

must find r.

$3^2+4^2=r^2$

$\boxed{5=r}$

$(x-h)^2+(y-k)^2=r^2$

$(x--3)^2+(y-5)^2=5^2$

$(x+3)^2+(y-5)^2=25$