Warm up: Chords & Segments 10/3

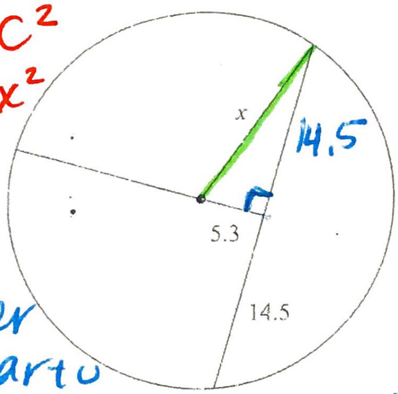
part·part = part·part

1. $5.3^2 + 14.5^2 = c^2$

$28.09 + 210.25 = x^2$

$238.34 = x^2$

$\boxed{15.4 = x}$



If a diameter is perpendicular to a chord, it also bisects the chord

2. $(x-2)(x-7) = 6 \cdot 6$

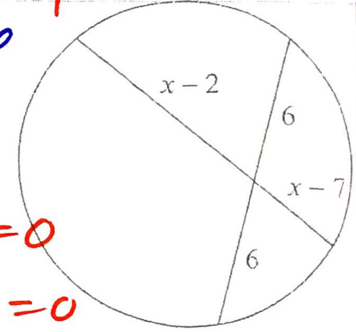
$x^2 - 9x + 14 = 36$

$x^2 - 9x - 22 = 0$

$(x - 11)(x + 2) = 0$

$x - 11 = 0 \quad x + 2 = 0$

$\boxed{x = 11} \quad \boxed{\cancel{x = -2}}$



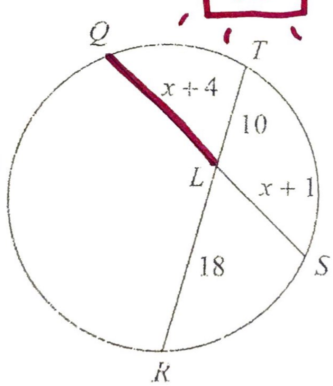
3. $(x+1)(x+4) = 10(18)$ Find LQ = $\boxed{15}$

$x^2 + 5x + 4 = 180$

$x^2 + 5x - 176 = 0$

$(x + 16)(x - 11) = 0$

$\boxed{\cancel{x = -16}} \quad \boxed{x = 11}$

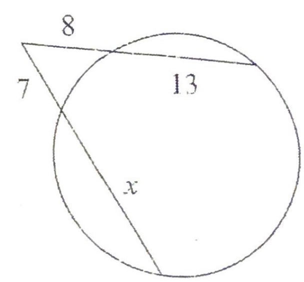


4. $8(21) = 7(7 + x)$

$168 = 49 + 7x$

$119 = 7x$

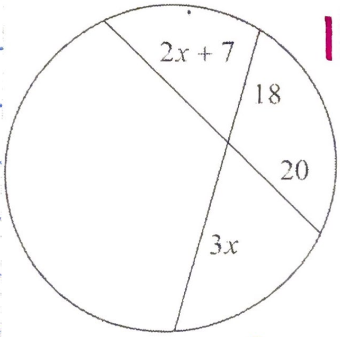
$\boxed{17 = x}$



out(whole) = out(whole)

Type 1: Chords Intersecting

part • part = part • part



$18(3x) = 20(2x+7)$

$54x = 40x + 140$

$14x = 140$

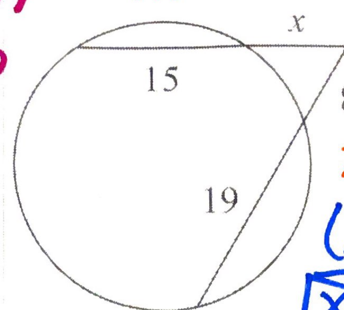
$\boxed{x = 10}$

multiply down the chord!

Type 2: Two Secants

out(whole) = out(whole)

$x(x+15) = 8(27)$



$x^2 + 15x = 216$

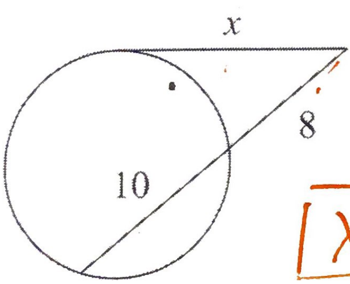
$x^2 + 15x - 216 = 0$

$(x+24)(x-9) = 0$

$\boxed{\cancel{x = -24}}$ $\boxed{x = 9}$

Type 3: Tan - Secant

$\tan^2 = \text{out(whole)}$



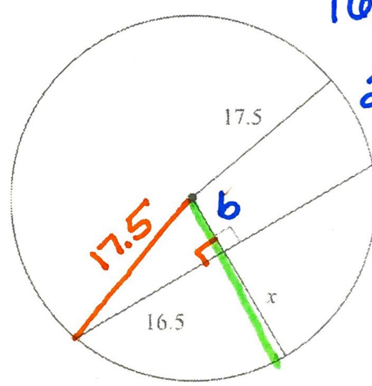
$x^2 = 8(18)$

$x^2 = 144$

$\boxed{x = 12}$

Chord Properties: If a diameter bisects a chord it also forms a right angle!

$16.5^2 + b^2 = 17.5^2$



$272.25 + b^2 = 306.25$

$b^2 = 34$

$b = 5.8$

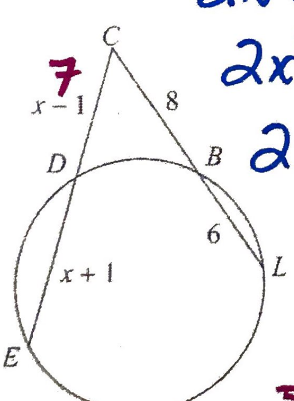
$17.5 - 5.8 = x$

$11.7 = x$

Always look for Radii

Additional Examples:

Find DC



$(x-1)(x-1+x+1) = 8(14)$

$2x(x-1) = 112$

$2x^2 - 2x = 112$

$2x^2 - 2x - 112 = 0$

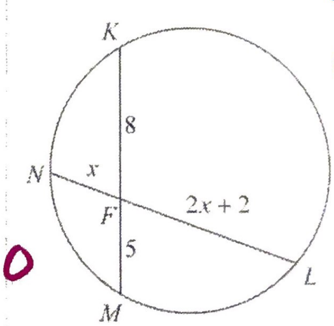
$x^2 - x - 56 = 0$

$(x+7)(x-8) = 0$

$\boxed{\cancel{x = -7}}$ $\boxed{x = 8}$

$\boxed{DC = 7}$

Find FN



$8(5) = x(2x+2)$

$40 = 2x^2 + 2x$

$0 = 2x^2 + 2x - 40$

$0 = x^2 + x - 20$

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

$\boxed{x = 4}$ $\boxed{\cancel{x = -5}}$

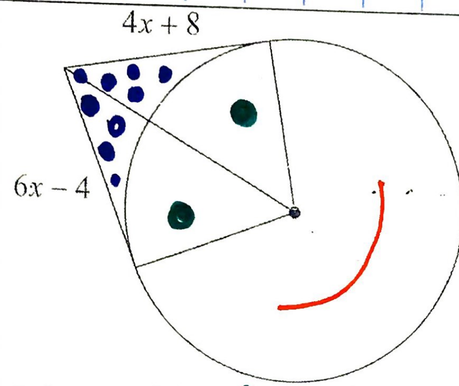
$\boxed{FN = 4}$

Tangents

Two tangent lines coming from the same exterior point will always be **congruent**.

Formula: tan = tan

Nickname: Party Hat

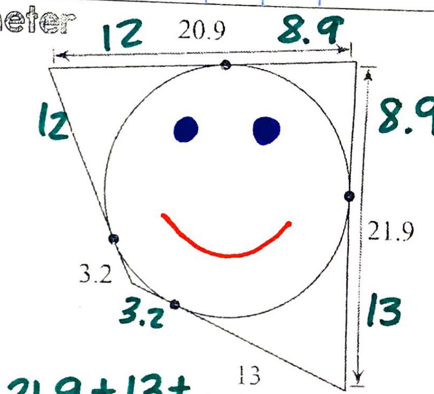


$4x + 8 = 6x - 4$

$12 = 2x$

$\boxed{6 = x}$

Find Perimeter



$P = 20.9 + 21.9 + 13 + 6.4 + 12$

$\boxed{P = 74.2}$

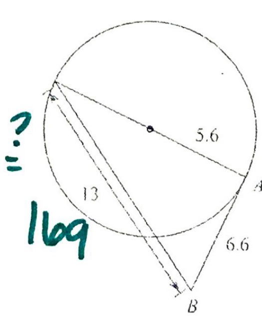
A radius drawn from a tangent point will always form a Right angle with the tangent line.

a) Prove that it's a tangent

b) Use the fact that it is tangent

Pythagorean Theorem!

A) Prove if it's tangent.



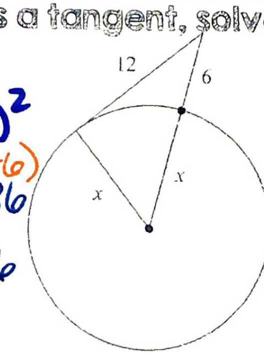
$11.2^2 + 6.6^2 = 13^2$

$125.44 + 43.56 \overset{?}{=} 169$

$169 \overset{\checkmark}{=} 169$

Test using P.T.

B) Given that this is a tangent, solve for x.



$x^2 + 12^2 = (x+6)^2$

$(x+6)(x+6)$

$x^2 + 144 = x^2 + 12x + 36$

$144 = 12x + 36$

$108 = 12x$

$\boxed{9 = x}$

Solve w/ P.T.

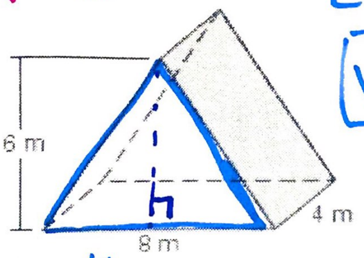
Volume

1. **Prism**

$V = B \cdot h$

$V = \underbrace{\left[\tfrac{1}{2} \cdot 6 \cdot 8\right]}_{B} \cdot \underbrace{4}_{h}$

$\boxed{V = 96 m^3}$



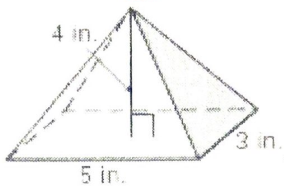
$A_\Delta = \tfrac{1}{2} b \cdot h$

2. **Pyramid**

$V = \dfrac{B \cdot h}{3}$

$V = \dfrac{\overbrace{[5 \cdot 3]}^{B} \cdot \overbrace{4}^{h}}{3}$

$\boxed{V = 20 in^3}$



$A = 5 \cdot 3 = 15$

3. **Cylinder**

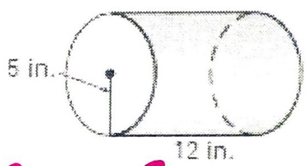
$V = B \cdot h$

$V = \underbrace{[\pi \cdot 5^2]}_{B} \cdot \underbrace{12}_{h}$

$= 25\pi \cdot 12$

$= \boxed{300\pi \ in^3}$

≈ 942.5



$A = \pi r^2$

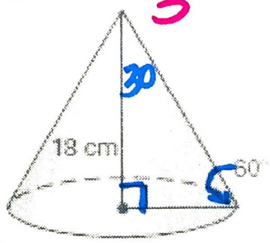
4. **Cone**

$V = \dfrac{B \cdot h}{3}$

$\dfrac{18}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{18\sqrt{3}}{3}$

$r = 6\sqrt{3}$

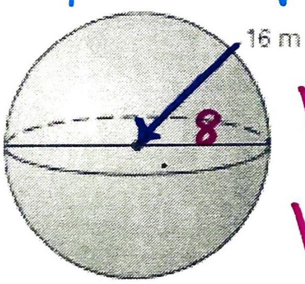
$V = \dfrac{\overbrace{\pi (6\sqrt{3})^2}^{B} \cdot \overbrace{18}^{h}}{3}$



$A = \pi r^2$

$V = 648\pi \approx 2035.75 \ cm^3$

5. **Sphere** $V = \tfrac{4}{3}\pi r^3$

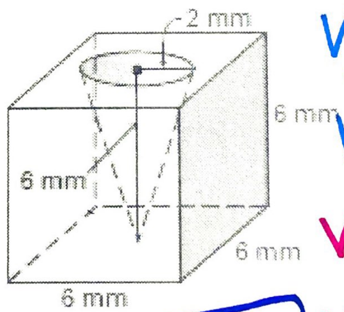


$V = \tfrac{4}{3}\pi (8)^3$

$V = \dfrac{2048\pi}{3}$

$V \approx 2144.66 \ m^3$

6. **Composite Solid** – *



$V_{Box} = 6 \times 6 \times 6$

$V_{Box} = 216$

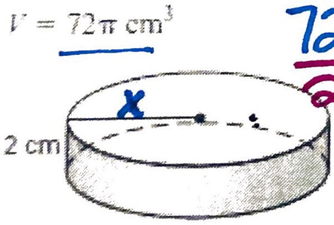
$V_{cone} = \dfrac{4\pi \cdot 6}{3}$

$V_{cone} = 8\pi$

$V_{Total} = \boxed{216 - 8\pi}$

$= \boxed{190.87}$

7. Solve for x **Working Backwards**

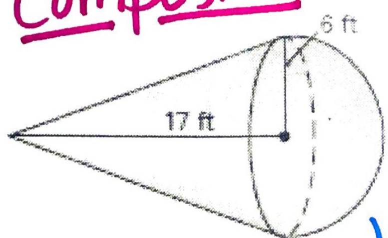


$\dfrac{72\pi}{2\pi} = \dfrac{2\pi x^2}{2\pi}$

$36 = x^2$

$\boxed{6 = x}$

8. **Composite** (+) *



$V_{Hemis} = \dfrac{\tfrac{4}{3}\pi (6)^3}{2}$

$= \boxed{144\pi}$

$V_{cone} = \dfrac{36\pi \cdot 17}{3}$

$V_{cone} = \boxed{204\pi}$

$\boxed{V_{Total} = 348\pi} = 1093.27$