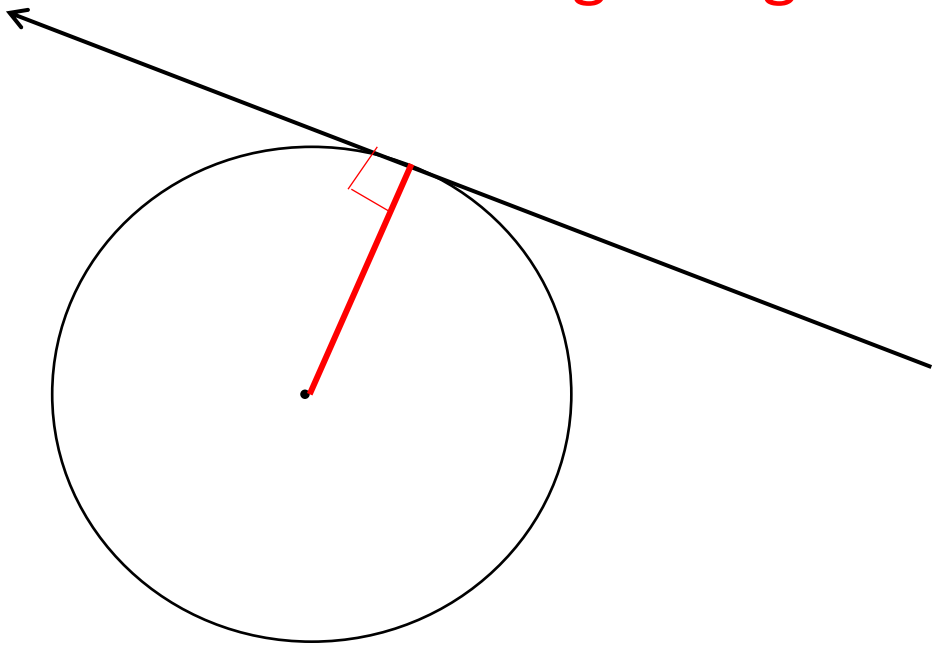
Tangents

IC2

Tangent – A line that intersects a circle only once

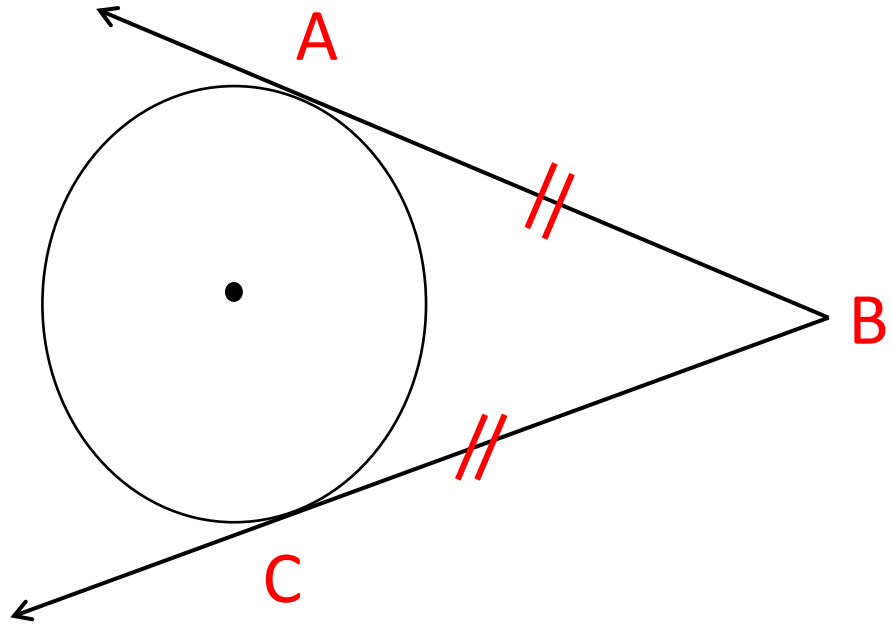
Facts Related to Tangents:

1) Radii and tangents to a circle intersect to form… A right angle



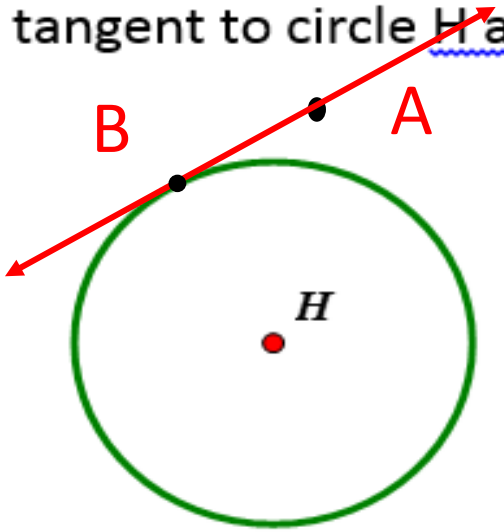
2) Tangents to a circle from a common external point are… Congruent

$\overline{AB} \cong \overline{CB}$

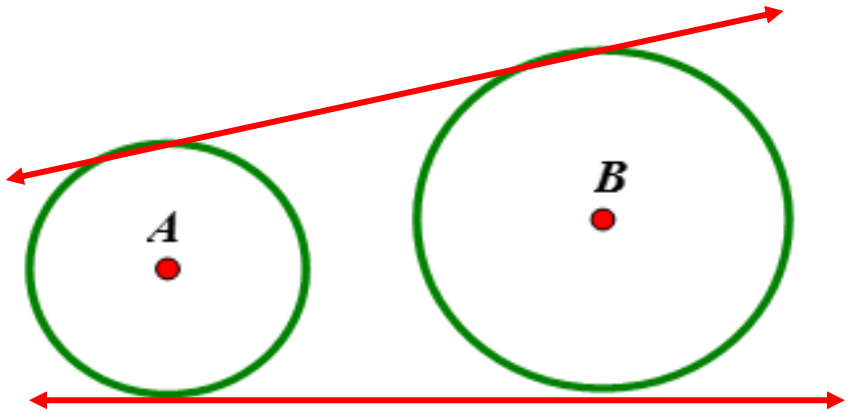


1. Draw the following relationships.

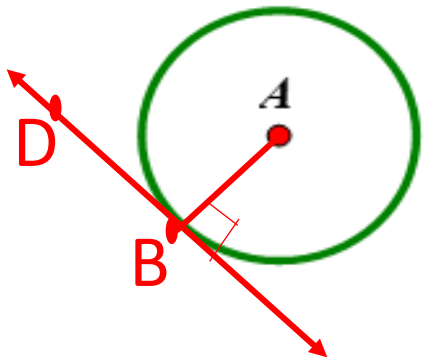
a) $\overleftrightarrow{AB}$ tangent to circle H at B.



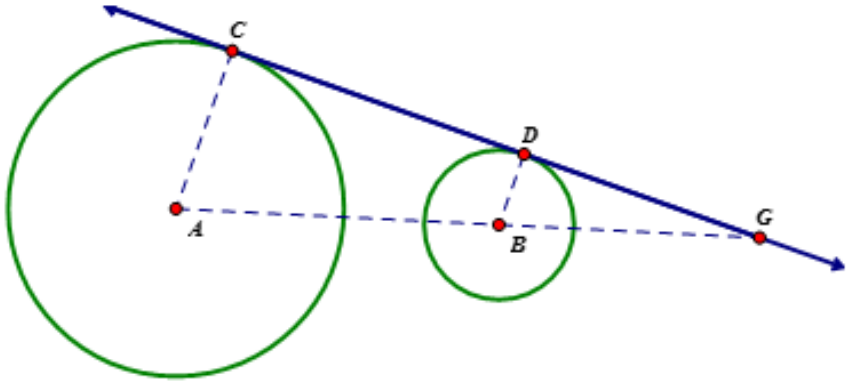
b) The external tangents of circle A and B.



c) In circle A, Radius $\overline{AB}$ perpendicular to $\overleftrightarrow{BD}$



2. $\overleftrightarrow{GC}$ **is a common external tangent to circles A and B. Explain why** $\Delta GBD \sim \Delta GAC$.



$\angle G \cong \angle G \rightarrow$ reflexive property

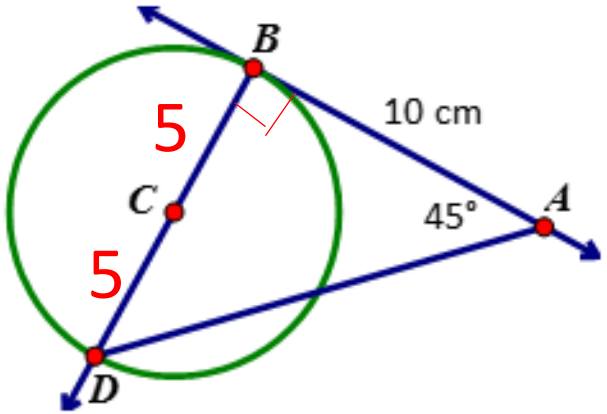
$\angle ACG \cong \angle BDG \rightarrow$ intersection of radii and tangents

form right ∠'s and all right ∠'s are ≅

ΔGBD ~ ΔGAC by AA~

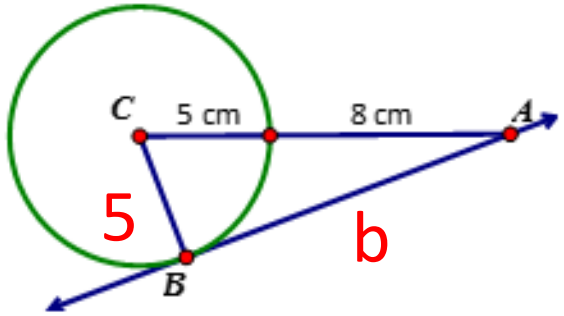
3. Solve for the missing information, given the $\overleftrightarrow{AB}$ is a tangent line to circle C.

a)



CB = 5 cm

b)



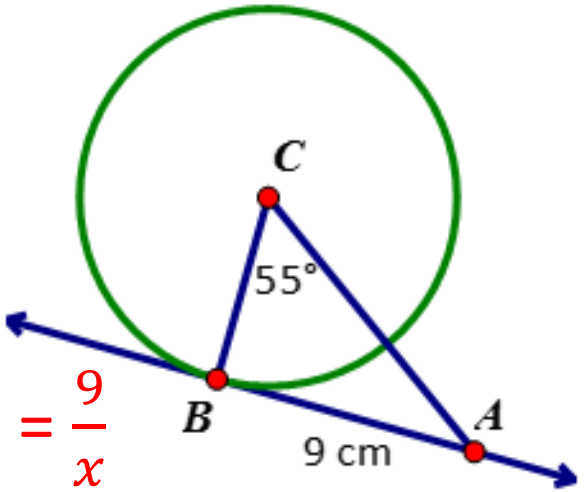
$a^2 + b^2 = c^2$

$5^2 + b^2 = 13^2$

$b = 12$

AB = 12 cm

c)



$\tan 55 = \frac{9}{x}$

$x = \frac{9}{\tan 55}$

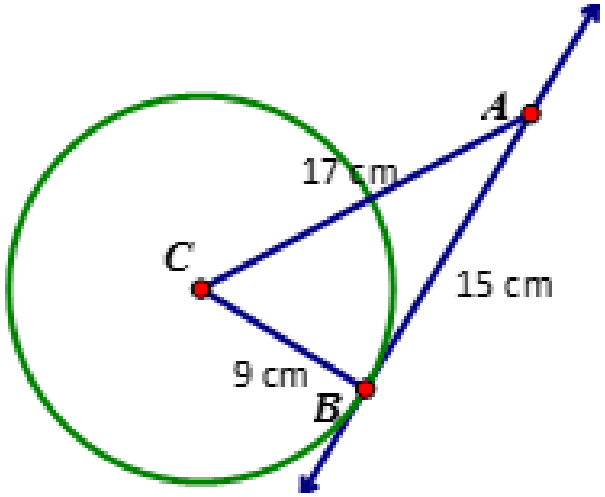
$x \approx 6.3$

CB = 6.3 cm

Needs to be a right Δ which means test the Pythagorean thm. Make longest side "c".

4. Determine if the $\overleftrightarrow{AB}$ is a tangent line or not.

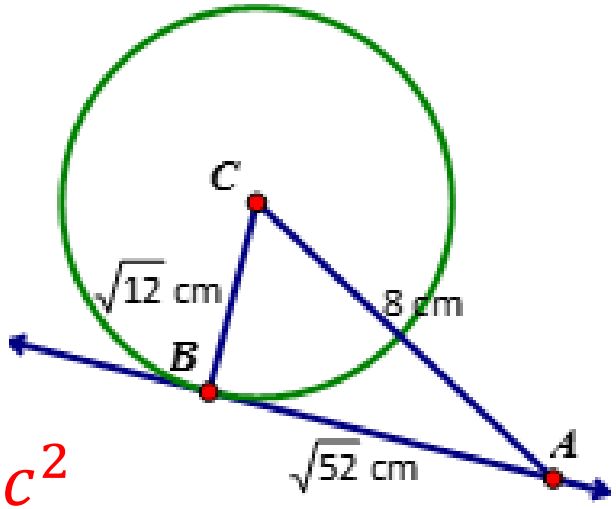
a)



$$a^2 + b^2 \stackrel{?}{=} c^2$$
$$15^2 + 9^2 \stackrel{?}{=} 17^2$$
$$306 \neq 289$$

Yes or (No)

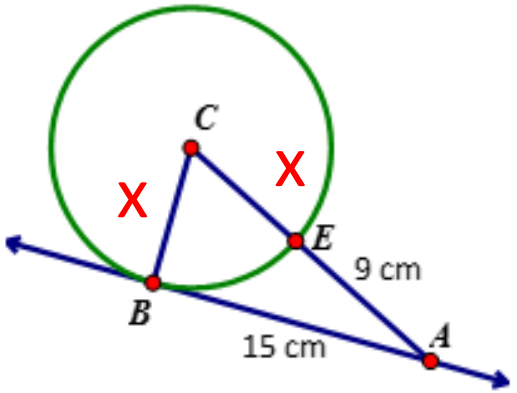
b)



$$a^2 + b^2 = c^2$$
$$\sqrt{12}^2 + \sqrt{52}^2 = 8^2$$
$$12 + 52 = 64$$

(Yes) or No

5. Given that $\overleftrightarrow{AB}$ is tangent to circle C and EA = 9 cm and AB = 15 cm, determine CB. (Hint: Label the two radii with x)

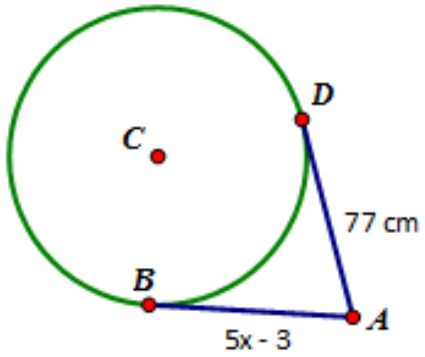


CB = 8

$$a^2 + b^2 = c^2$$
$$x^2 + 15^2 = (x+9)^2$$
$$x^2 + 225 = (x+9)(x+9)$$
$$x^2 + 225 = x^2 + 9x + 9x + 81$$
$$x^2 + 225 = x^2 + 18x + 81$$
$$225 = 18x + 81$$
$$144 = 18x$$
$$x = 8$$

6. Solve for x ($\overline{AB}$ and $\overline{AD}$ are tangent lines)

a)



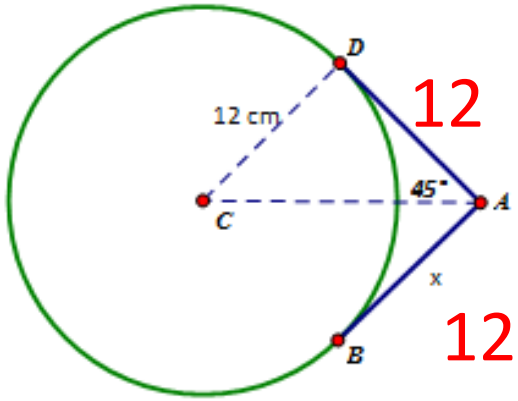
5x – 3 = 77

5x = 80

x = 16

x = 16 cm

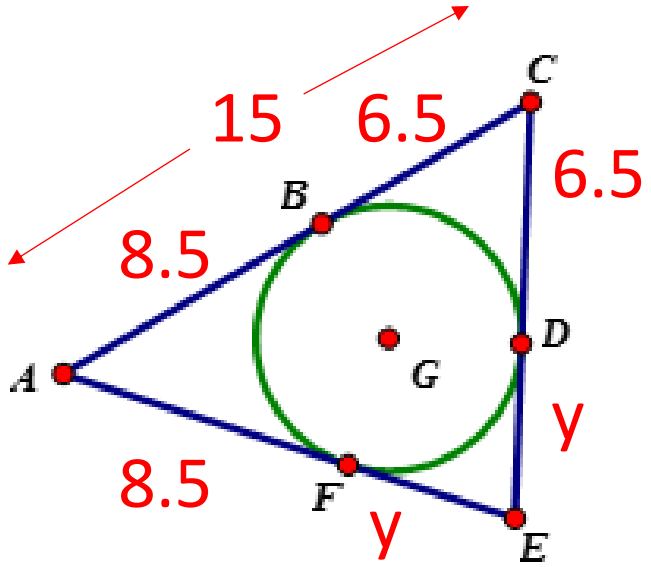
b)



x = 12 cm

7. Solve for the missing information (Lines that appear to be tangent are tangent.)

Perimeter = 40 cm, AC = 15 cm, AF = 8.5 cm



FE = _____

15 + 6.5 + y + y + 8.5 = 40

2y + 30 = 40

2y = 10

y = 5