

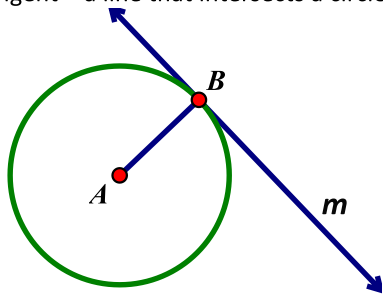
Circles – Tangent

Notes Section 13.1

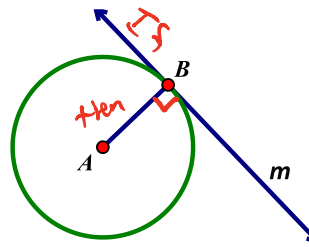
Name _____

G.C.A.2

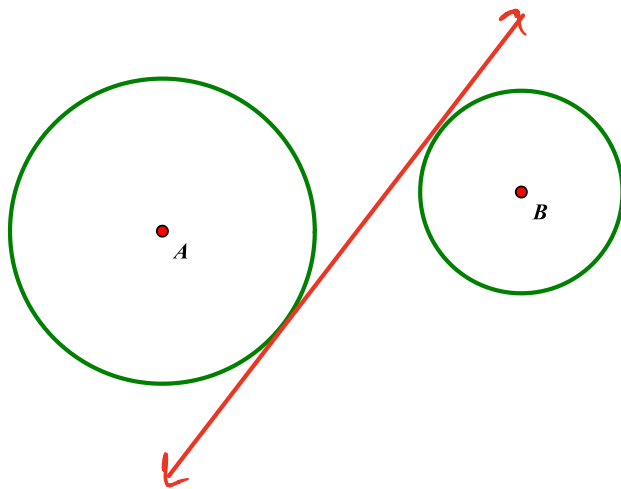
Tangent – a line that intersects a circle once



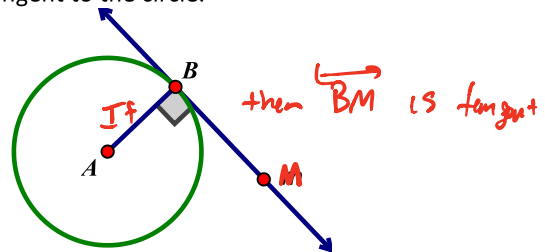
Theorem – If a line is tangent to a given circle, then the tangent line is perpendicular to the radius at the point of tangency.



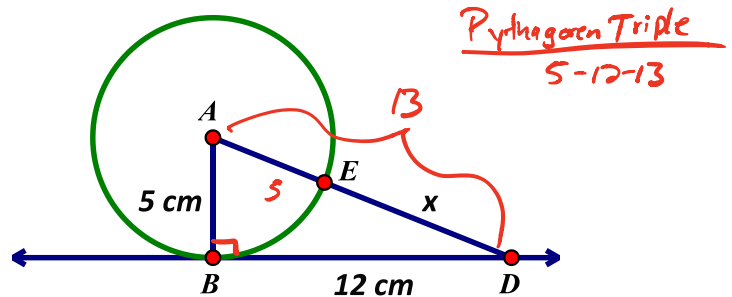
Internally Common Tangent Lines



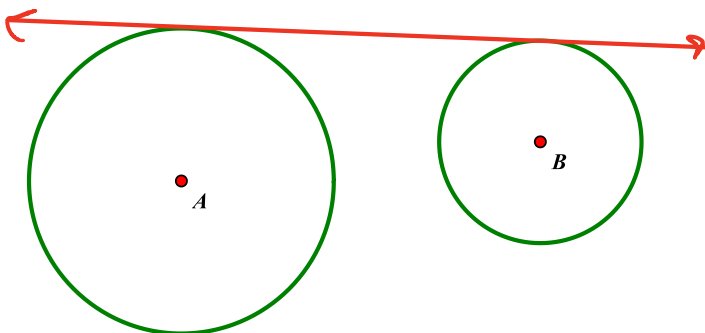
Converse of the Theorem -- If a line is perpendicular to a radius of a circle at its endpoint on the circle, then the line is tangent to the circle.



Given that \overline{BD} is a tangent line and that the radius of circle A is 5 cm and $BD = 12$ cm, determine ED?



Externally Common Tangent Lines



$$x + 5 = 13$$

$$x = 8 \text{ cm}$$

$$ED = 8 \text{ cm}$$

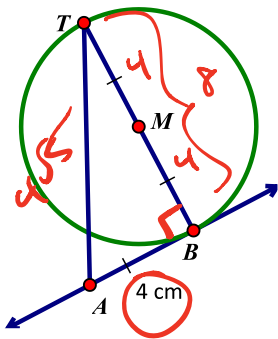
Circles – Tangent

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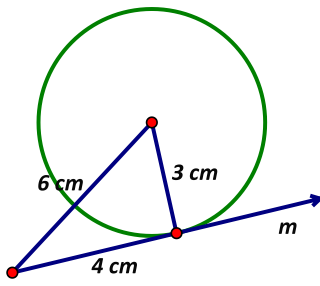
Name _____

#1) Solve for the requested information, given the \overline{AB} is a tangent line to circle M. Find AT (2 decimals)



$$\begin{aligned}
 AB^2 + TB^2 &= AT^2 \\
 4^2 + (8)^2 &= AT^2 \\
 16 + 64 &= AT^2 \\
 80 &= AT^2 \\
 \pm\sqrt{80} &= AT \\
 \sqrt{4 \cdot 20} &= AT \\
 \sqrt{4 \cdot 4 \cdot 5} &= AT \\
 4\sqrt{5} &= AT
 \end{aligned}$$

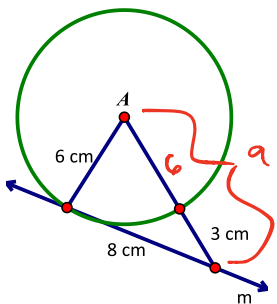
#2) Is line m a tangent line?



$$\begin{aligned}
 \text{Does } x^2 + y^2 &= r^2 \\
 (4)^2 + (3)^2 &\neq (6)^2 \\
 16 + 9 &\neq 36 \\
 25 &\neq 36
 \end{aligned}$$

m is not tangent

#3) Is line m a tangent line to circle A?



$$\begin{aligned}
 \text{Does } x^2 + y^2 &= r^2 \\
 (8)^2 + (6)^2 &\neq (9)^2 \\
 64 + 36 &\neq 81 \\
 100 &\neq 81
 \end{aligned}$$

m is not tangent

#4)

$$x^2 + y^2 - 10x + 8y + 16 = 0$$

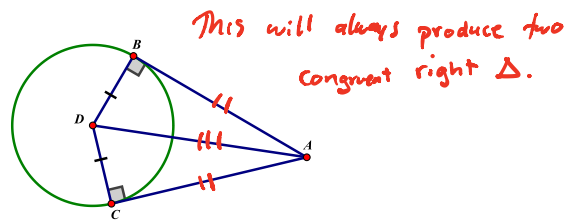
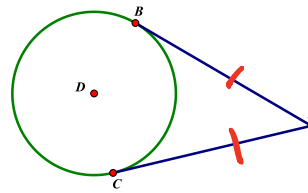
What is the radius of the circle?

$$(x^2 - 10x + 25) + (y^2 + 8y + 16) = -16 + 25 + 16$$

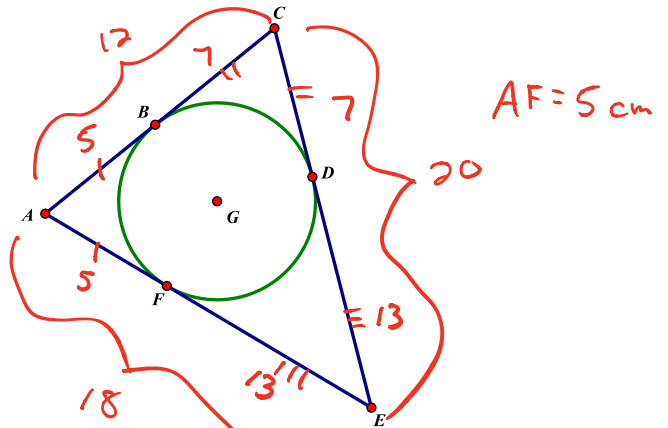
$$(x - 5)^2 + (y + 4)^2 = 25$$

$$r = 5$$

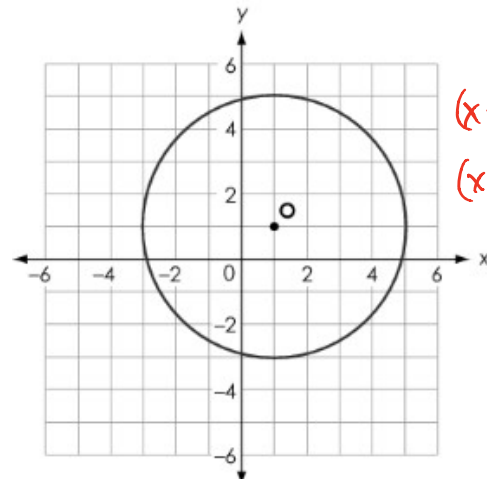
Theorem – If two segments from the same exterior point are tangent to a circle, then they are congruent to each other.



#5) The three segments are tangent at point B, F, and D. If AC = 12 cm, CE = 20 cm and FE = 13 cm, determine AF?



#6) Create the equation of the circle.



$$(x - 1)^2 + (y - 1)^2 = 4^2$$

$$(x - 1)^2 + (y - 1)^2 = 16$$