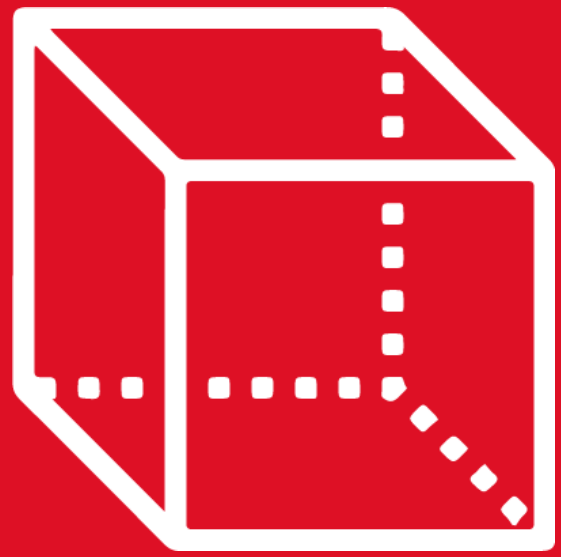
GEOMETRY

Capítulo 15

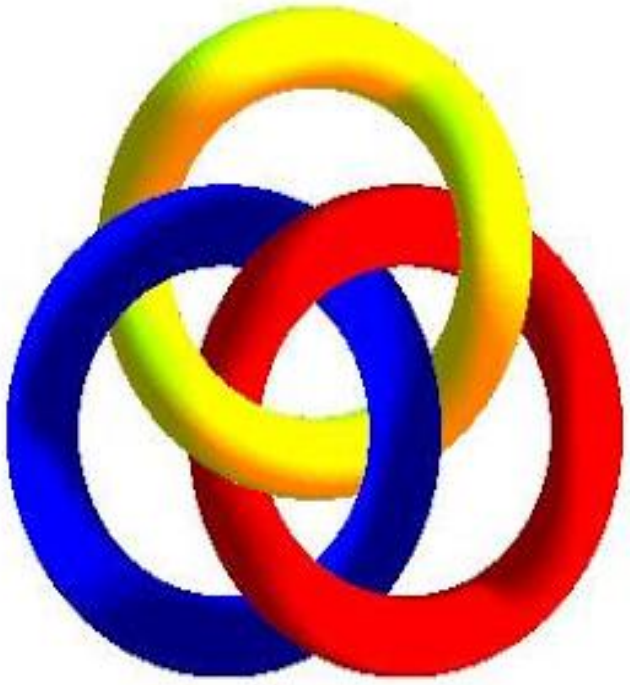


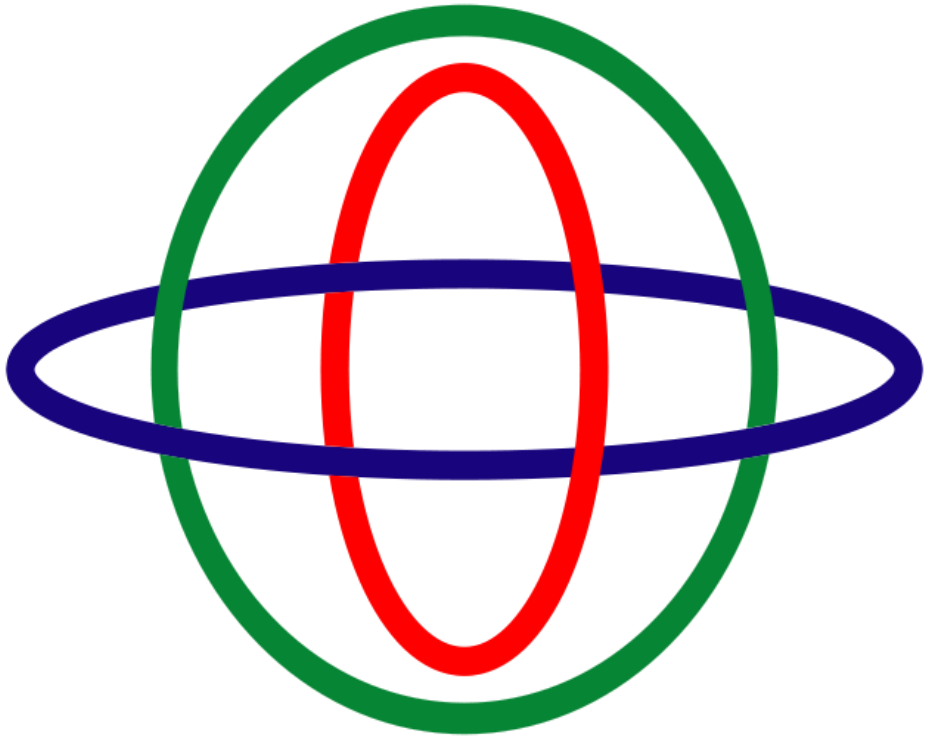
2n
SECONDARY
d

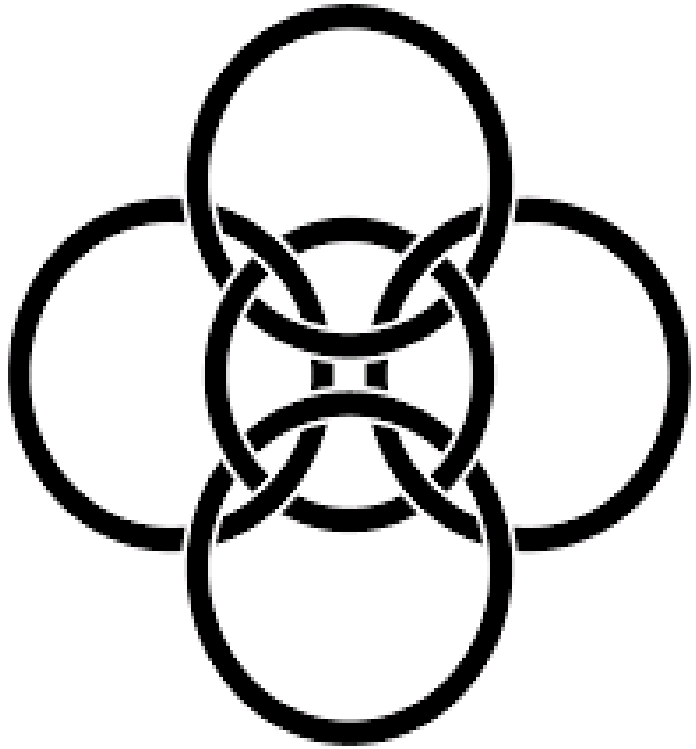
TEOREMA DE PONCELET Y PITOT

SACO OLIVEROS

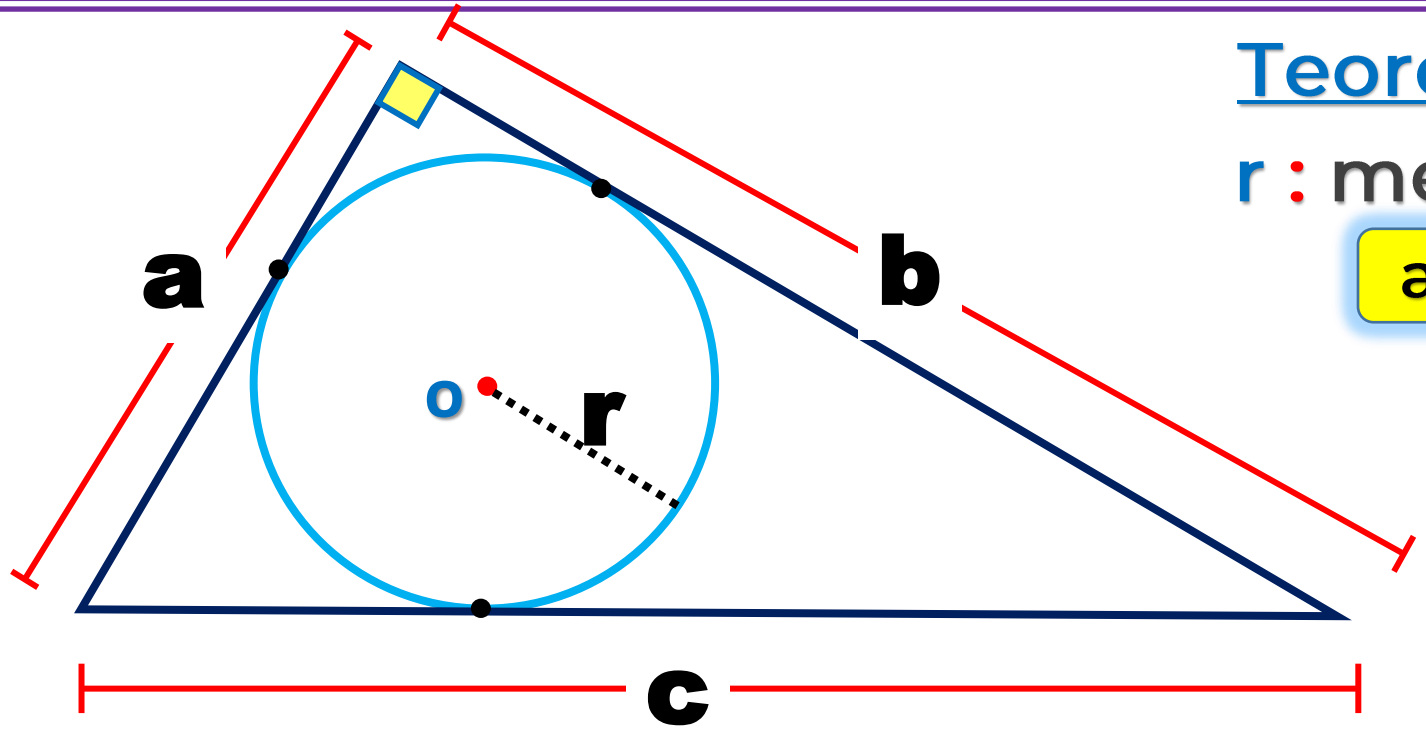
Los anillos de Borromeo son un objeto topológico consistente en tres anillos unidos de tal manera que, tomados de dos en dos, no se entrelazan.







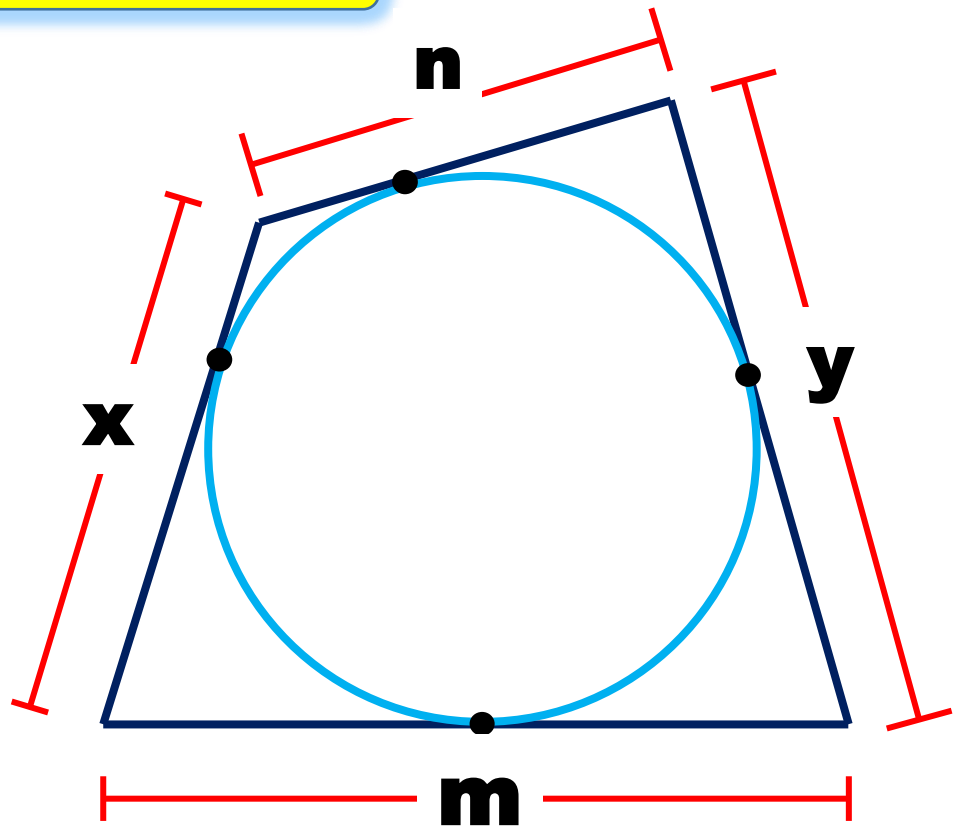
Teorema de Poncelet y Pitot



Teorema de Poncelet

r : medida del inradio

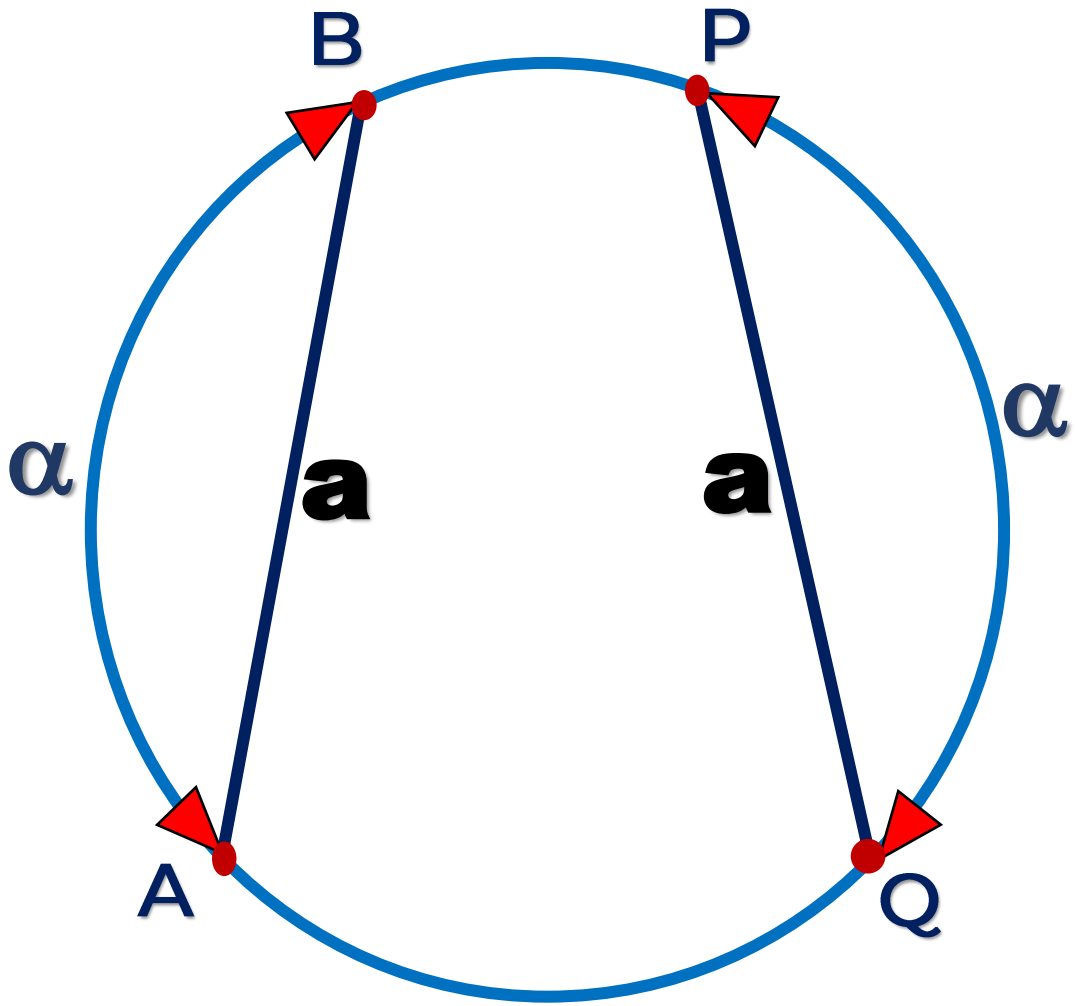
$$a + b = c + 2r$$



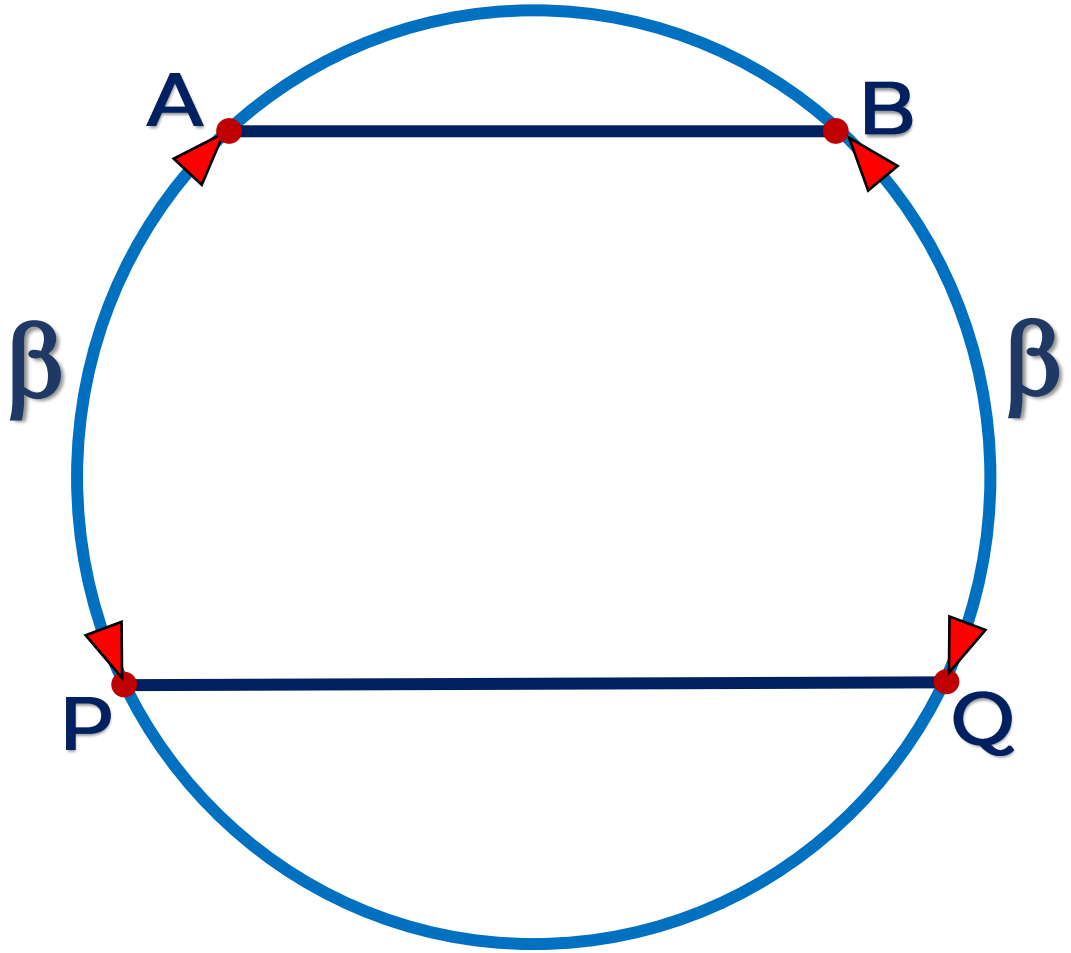
Teorema de Pitot

$$x + y = m + n$$

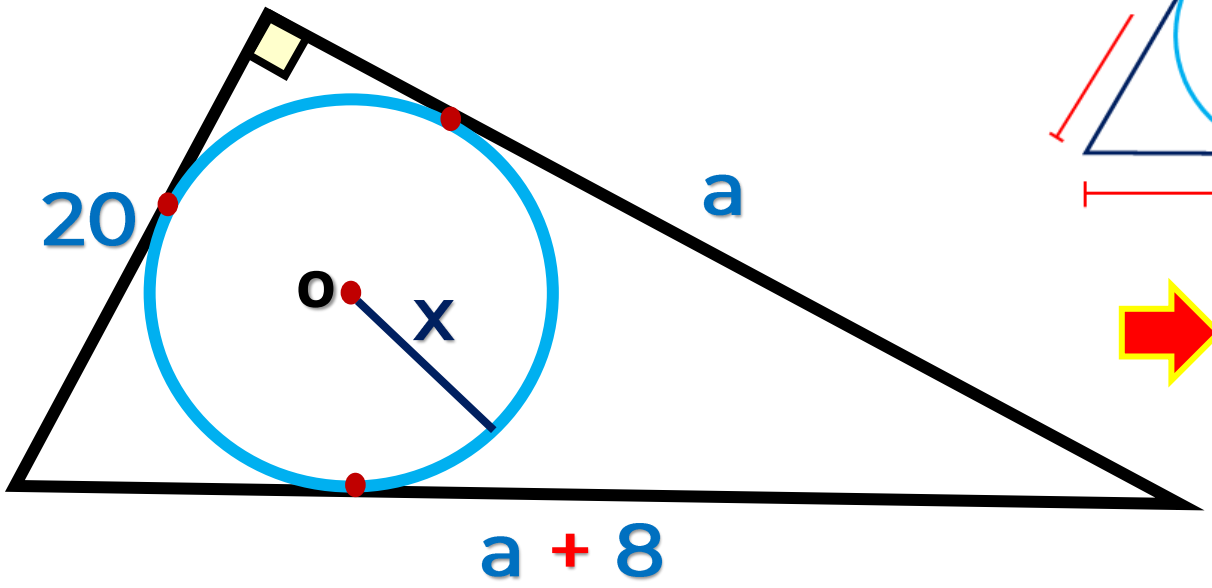
Si: $AB = PQ \Leftrightarrow \overset{\frown}{mAB} = \overset{\frown}{mPQ}$



Si: $\overline{AB} // \overline{PQ} \Leftrightarrow \overset{\frown}{mAP} = \overset{\frown}{mBQ}$



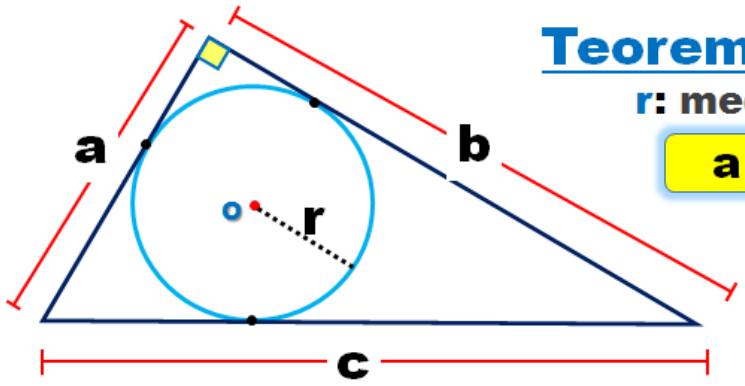
1. Un cateto de un triángulo mide 20 m y los otros dos se diferencian en 8. Halle la longitud del inradio.



Teorema de Poncelet

r: medida del inradio

$a + b = c + 2r$



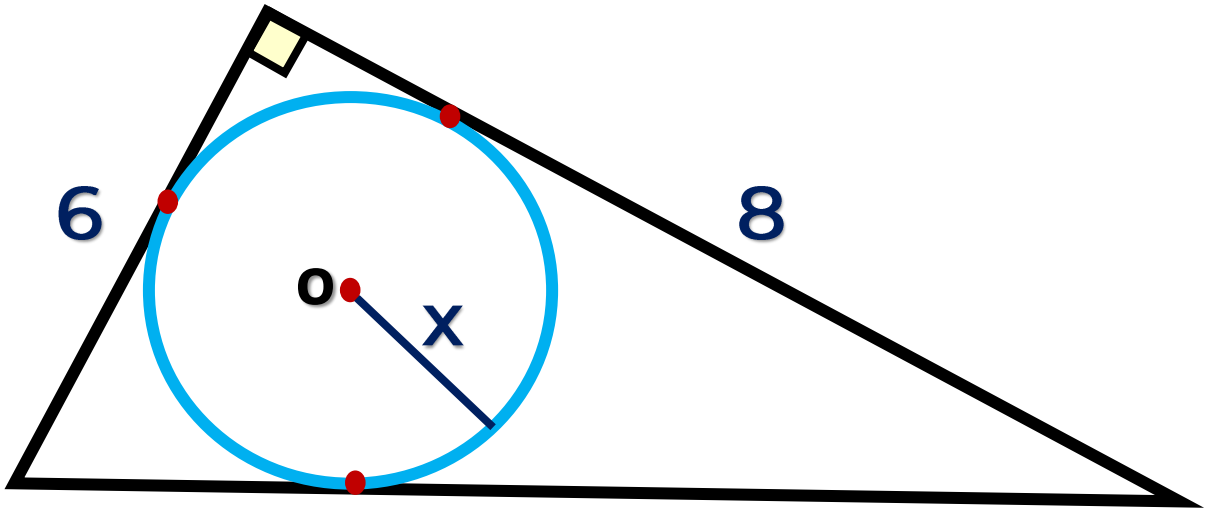
$20 + \cancel{a} = \cancel{a} + 8 + 2x$

$20 = 8 + 2x$

$12 = 2x$

$x = 6$

2. Los catetos de un triángulo miden 6 m y 8 m. Halle la longitud del inradio.



$C = 10$

Teorema de Pitágoras

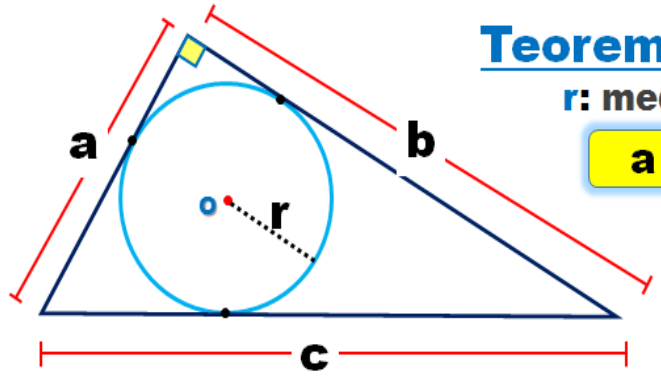
$$c^2 = 6^2 + 8^2$$

$$c = 10$$

Teorema de Poncelet

r: medida del inradio

$$a + b = c + 2r$$



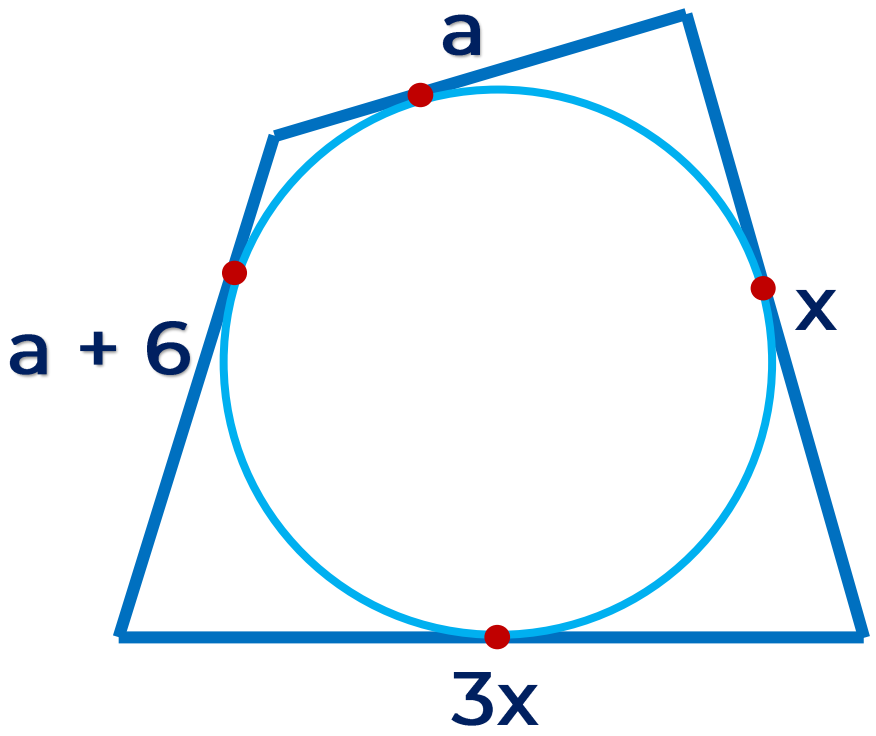
$$6 + 8 = 10 + 2x$$

$$14 = 10 + 2x$$

$$4 = 2x$$

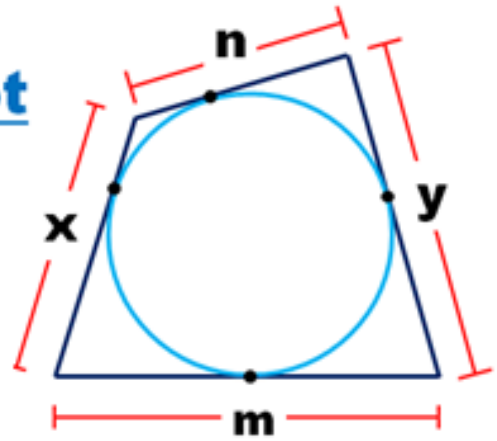
$$x = 2$$

3. Halle el valor de x, si el cuadrilátero está circunscrito a la circunferencia.



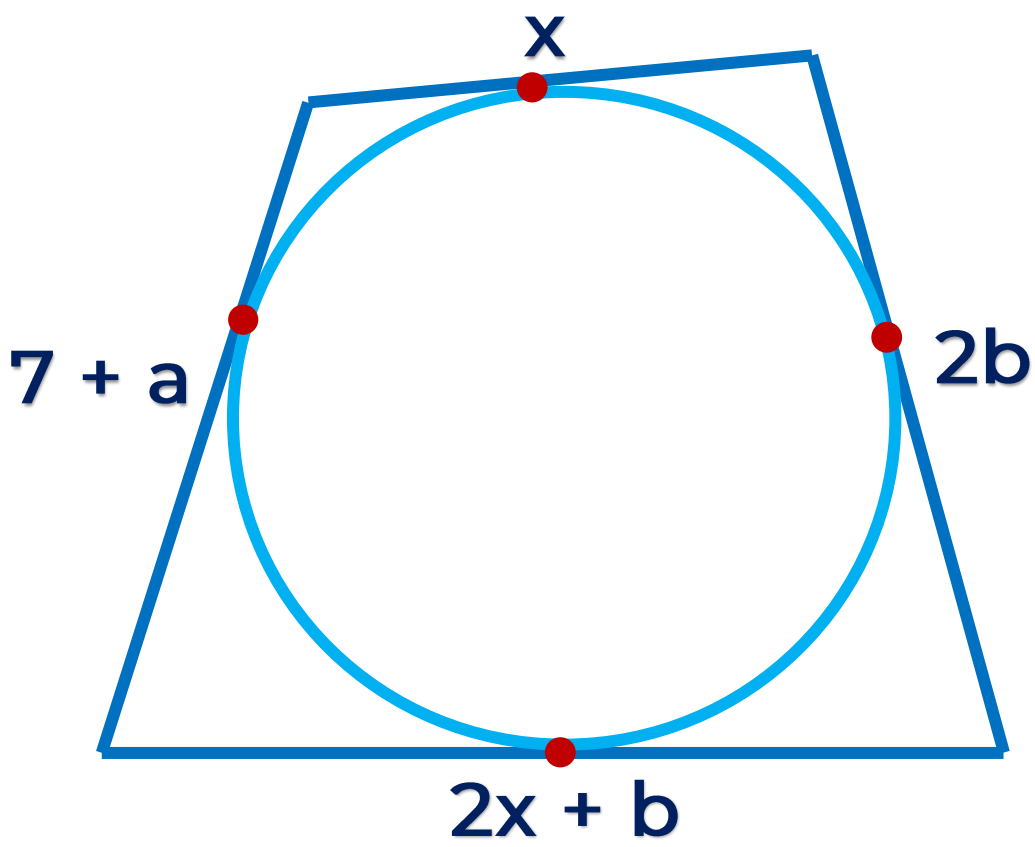
Teorema de Pitot

$x + y = m + n$



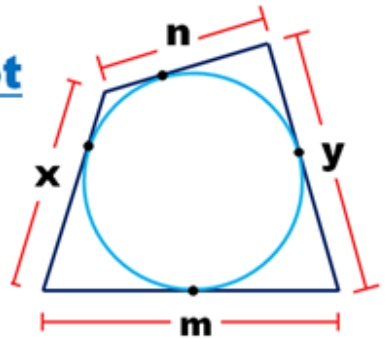
$$a + 6 + x = 3x + a$$
$$6 + x = 3x$$
$$6 = 2x$$
$$x = 3$$

4. Si a + b = 8, halle el valor de x, si la circunferencia está inscrita en el cuadrilátero.



Teorema de Pitot

$x + y = m + n$



$$7 + a + 2b = 2x + b + x$$

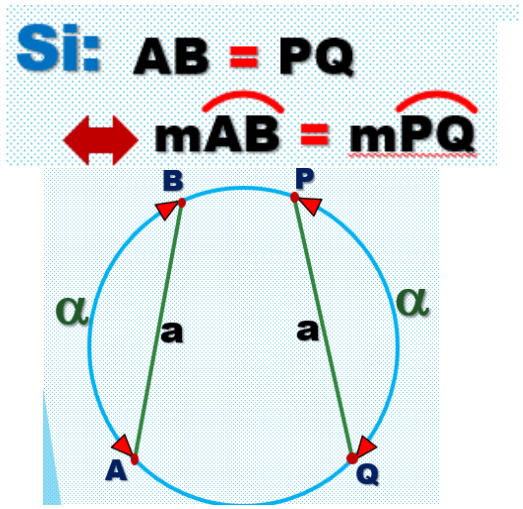
$$7 + a + b = 3x$$

$$7 + 8 = 3x$$

$$15 = 3x$$

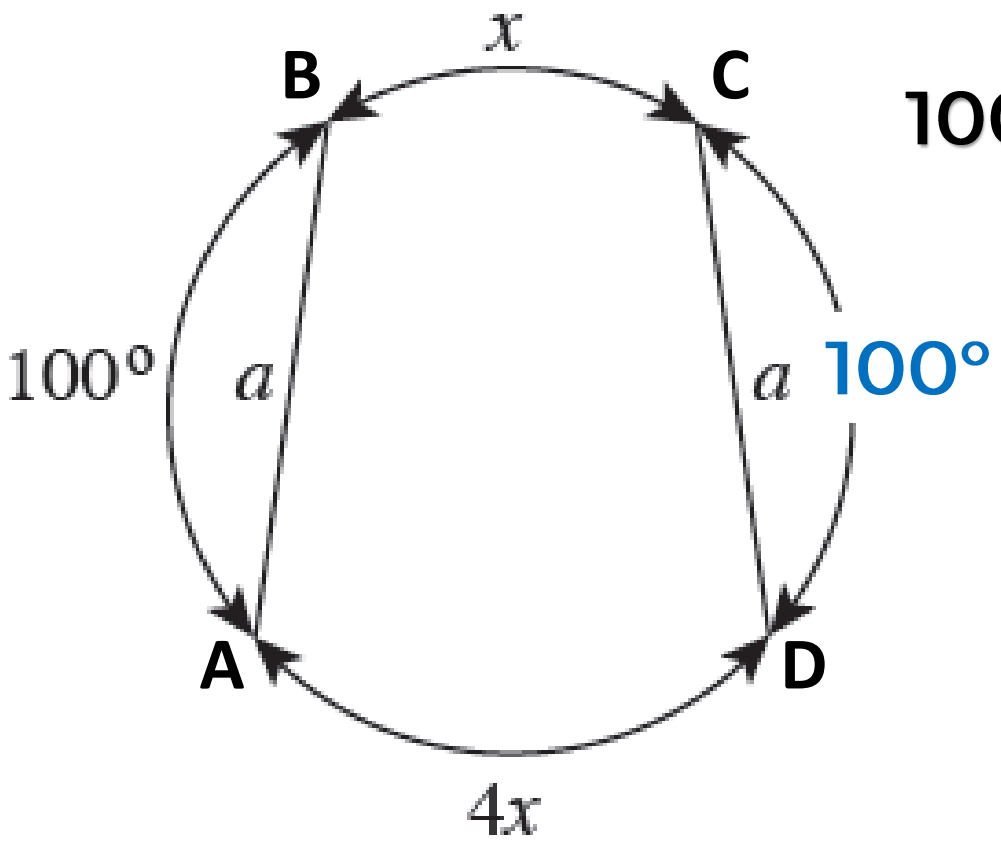
$$x = 5$$

5. Halle el valor de *x*.



$m\overset{\frown}{AB} = m\overset{\frown}{CD}$

$m\overset{\frown}{CD} = 100°$



En la circunferencia

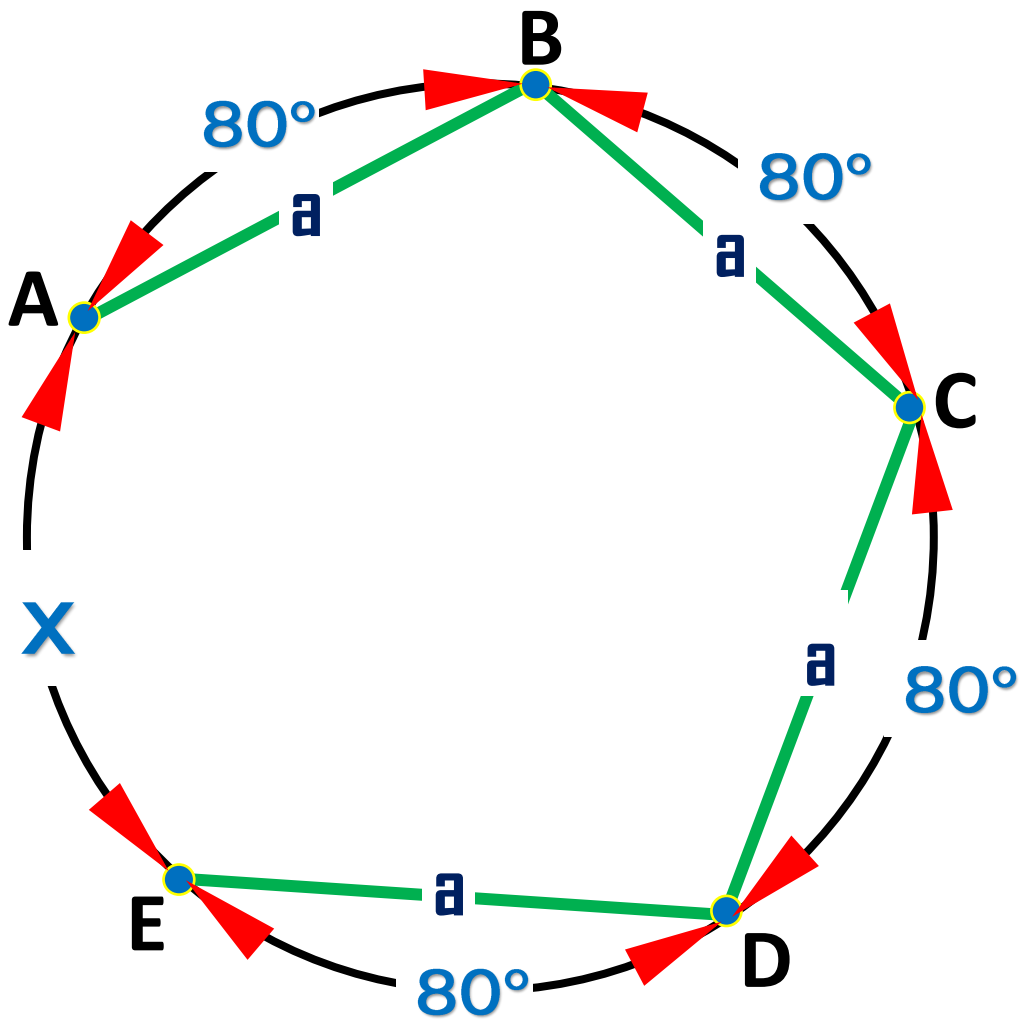
$100° + x + 100° + 4x = 360$

$200° + 5x = 360$

$5x = 160°$

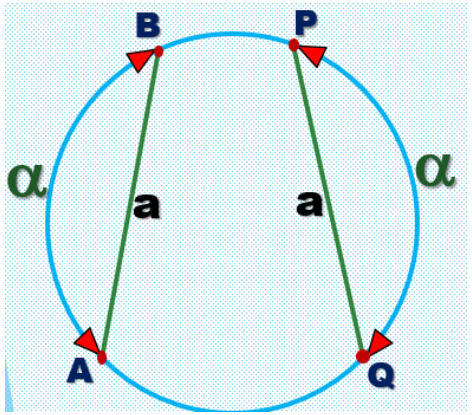
$x = 32°$

6. En una circunferencia se ubican los puntos A, B, C, D y E. Si AB = BC = CD = $\overset{\frown}{DE}$ y m$\overset{\frown}{AB}$ = 80°, halle m$\overset{\frown}{AE}$.



Si: AB = PQ

$\Leftrightarrow$ m$\overset{\frown}{AB}$ = m$\overset{\frown}{PQ}$



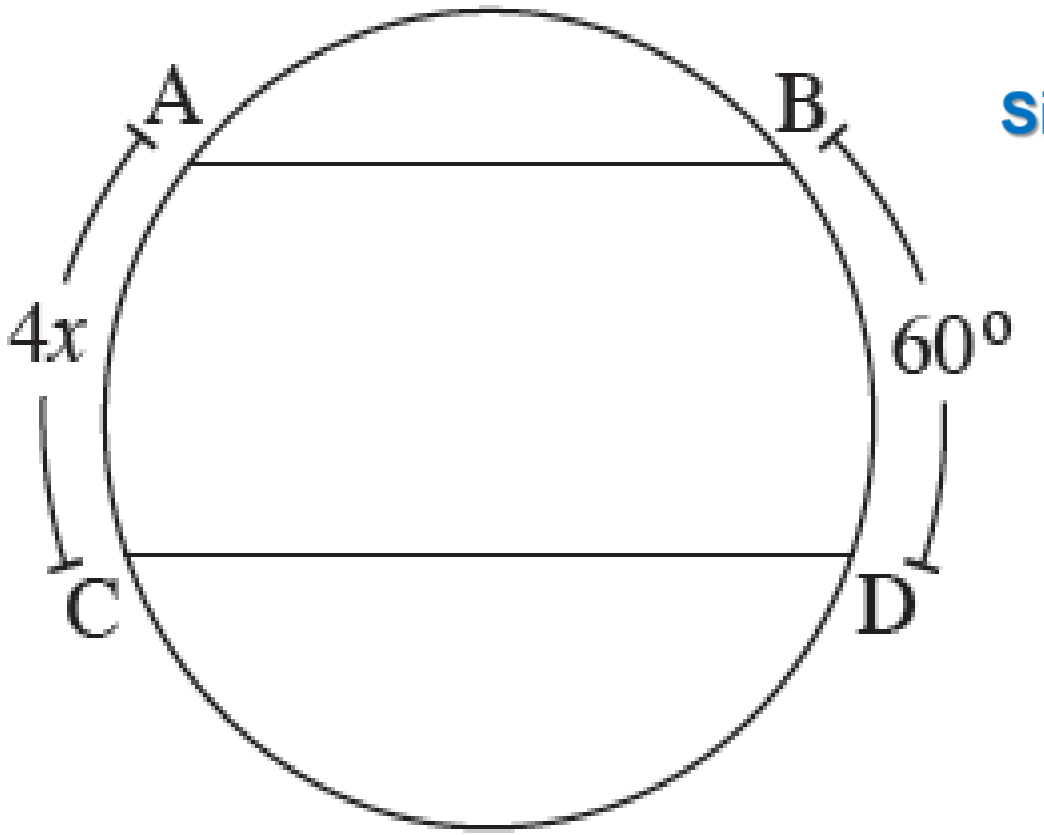
En la circunferencia

$80° + 80° + 80° + 80° + x = 360°$

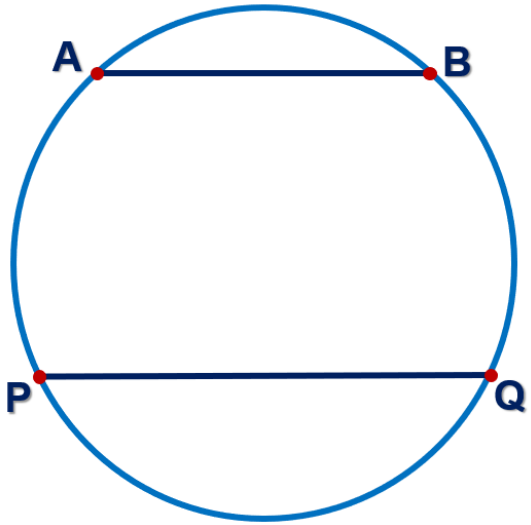
$320° + x = 360°$

$x = 40°$

7. Si $\overline{AB}$ // $\overline{CD}$, halle el valor de *x*.



Si: $\overline{AB}//\overline{PQ} \Leftrightarrow m\overset{\frown}{AP} = m\overset{\frown}{BQ}$

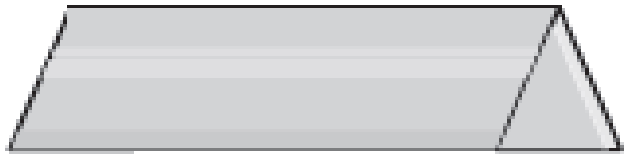


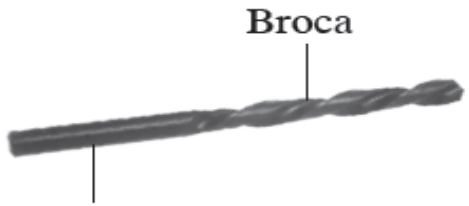
$$m\overset{\frown}{AC} = m\overset{\frown}{BD}$$

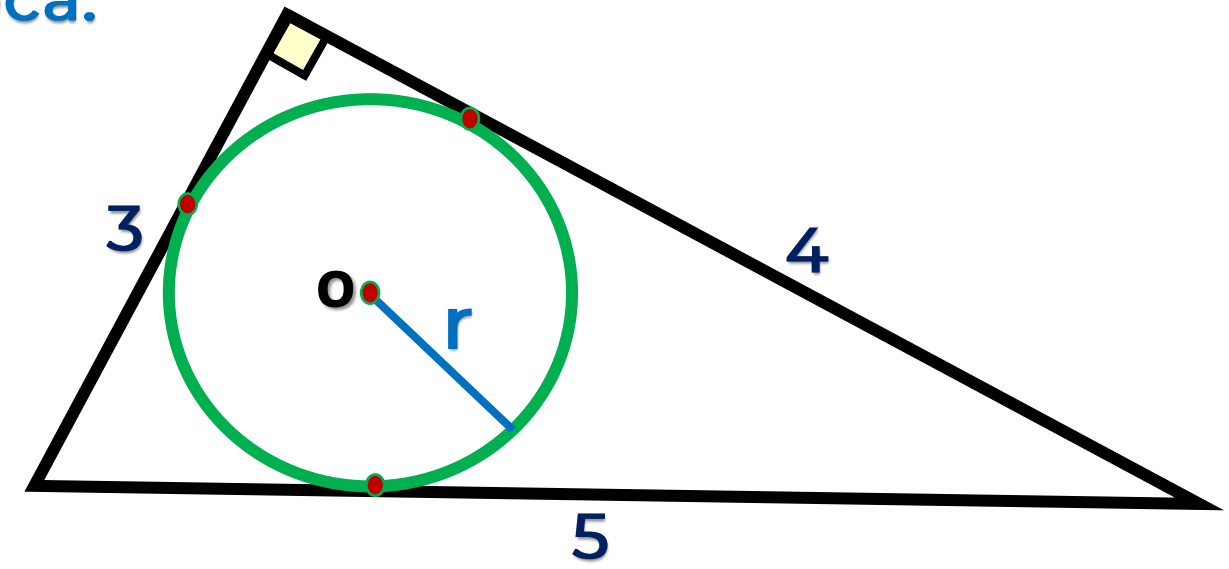
$$4x = 60°$$

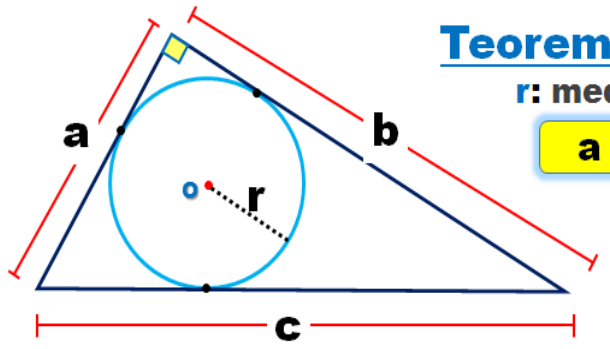
$$x = 15°$$

8. Se desea construir una broca de acero de máximo diámetro, que se pueda inscribir en el triángulo ABC, cuyos lados miden 3, 4 y 5 cm. Determine el diámetro de la broca.









Teorema de Poncelet

r: medida del inradio

$a + b = c + 2r$

$3 + 4 = 5 + 2r$

$7 = 5 + 2r$

$2 = 2r$

Diámetro = 2cm