

10.7. Honors Geometry

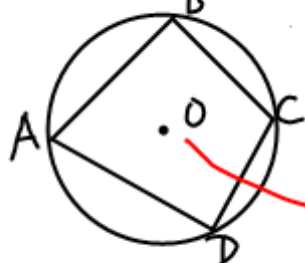
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Target 9B. Identify the relationships between the angles and their intercepted arcs

Part I

For each bullet, write an explanation with a diagram to explain how the ideas of inscribed and circumscribed are related.

- If a figure is inscribed, then the circle is circumscribed.



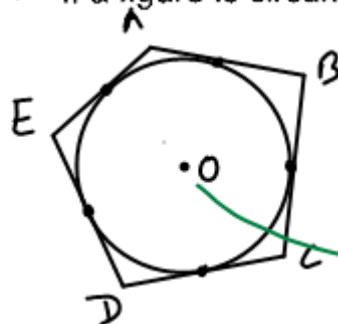
• $ABCD$ is inscribed in $\odot O$.

• $\odot O$ is circumscribed about $ABCD$.

} same meaning

Circumcenter: center of \odot circumscribed about polygon.

- If a figure is circumscribed, the circle is inscribed.

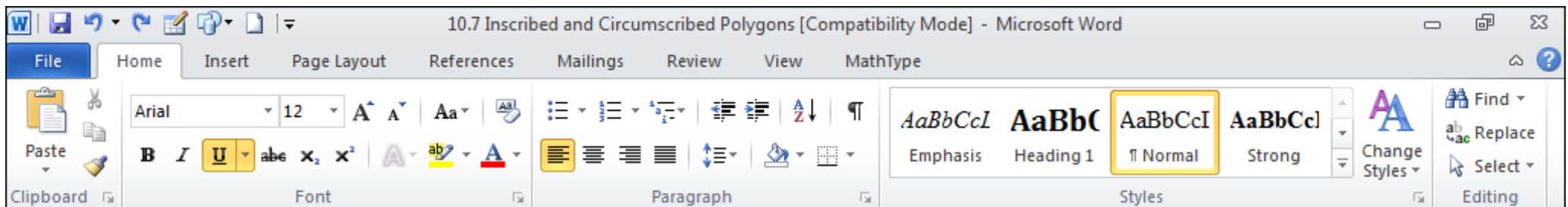


• $\odot O$ is inscribed inside $ABCDE$

• $ABCDE$ is circumscribed about $\odot O$.

} same meaning

Incenter: center of \odot inscribed in a polygon



Part II

Using the information from the reading, write an equation and solve for x .

1. Equation

$$3(x+4) + (x+8) = 180^\circ$$

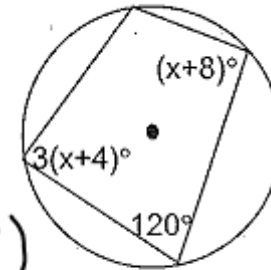
$$3x + 12 + x + 8 = 180$$

$$4x + 20 = 180$$

$$4x = 160 \Rightarrow \boxed{x = 40}$$

Reason for the equation

Opp. \angle s of a quadrilateral inscribed in a \odot are supplementary! (Add up to 180°)



2. Given: ABCD is a parallelogram

Equation

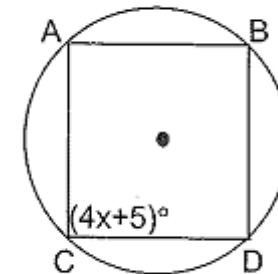
$$4x + 5 = 90$$

$$4x = 85$$

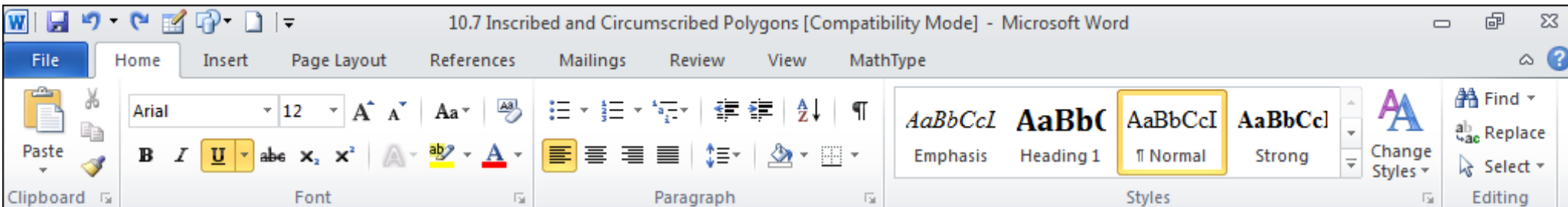
$$\boxed{x = 21.25}$$

Reason for the equation

A \parallel -gram inscribed in a \odot must be a rectangle. Thus its \angle s are 90° .



> We saw on Nspire!

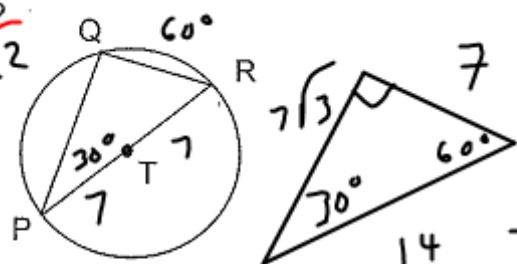


Challenge Examples

1. In a diagram, $\triangle PQR$ is inscribed in $\odot T$. The area of the circle is 49π and the measure of arc $\widehat{QR} = 60^\circ$. What is the length of side \overline{PQ} ?

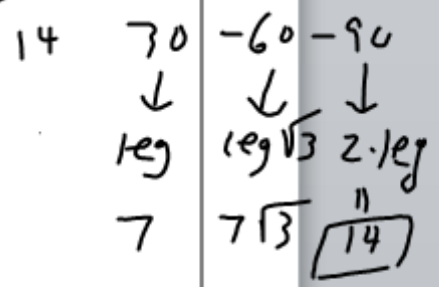
$$A_0 = \pi r^2 \Rightarrow 49\pi = \pi r^2 \Rightarrow 49 = r^2$$

$$\Rightarrow r = 7 \quad \therefore PT = 7 \quad \therefore PR = 14$$

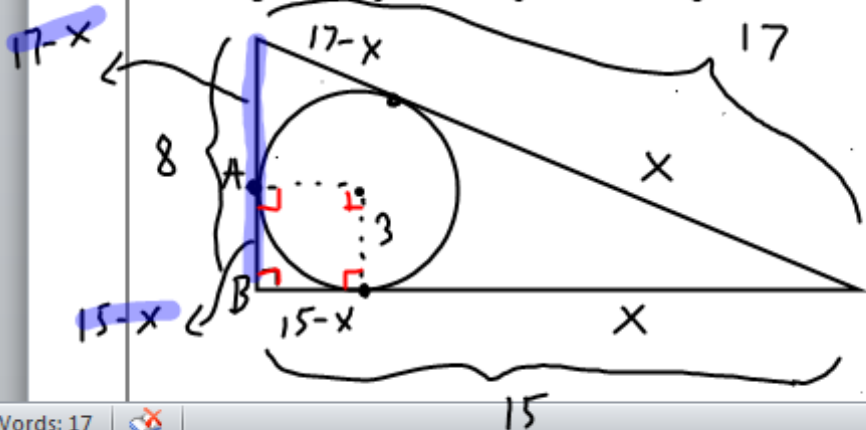


$m\angle P = \frac{1}{2}m\widehat{QR} = \frac{1}{2}(60) = 30$ since P is on \odot .

$\therefore \overline{PQ} = 7\sqrt{3}$ by property of $30^\circ-60^\circ-90^\circ$ Δ s



2. A right triangle has legs measuring 8 and 15. Find the radius of the inscribed circle.



$$(8, 15, 17) \Delta$$

$$17 - x + 15 - x = 8$$

$$32 - 2x = 8$$

$$-2x = -24$$

$$x = 12$$

$$AB = 15 - x$$

$$= 15 - 12$$

$$= 3$$

$$\therefore r = 3 \quad \checkmark$$

10.7 Inscribed and Circumscribed Polygons [Compatibility Mode] - Microsoft Word

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3. The lengths of the diagonals of a rhombus are respectively 64 and 120. Find the length of a radius of the inscribed circle of the rhombus. Express your answer as an improper fraction reduced to lowest terms.

*Solve for extra credit!
Show work to justify answer*

7 root 3, 3, 480/17

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