ROTATIONAL POSITION & DISPLACEMENT

● Rotational Motion is motion around a _____ point, that is, in a _____ path.

X → ____

- The rotational equivalent of linear POSITION **(___)** is Rotational/Angular position **(___).**

LINEAR POSITION	ROTATIONAL POSITION
- How far you are from the _____.	- How far you are from the _____.
- Measured in _____.	- Measured in _____.
- Origin is where _____.	- Origin is where _____.
- Origin is _____.	- Origin is _____:
- Direction **(+/-)** is _____.	- Always at the _____.
	- Direction **(+/-)** is _____:
	CW ◯ **CCW** ◯

● The rotational equivalent of linear DISPLACEMENT **(____)** is Rotational Displacement **(____).**

ΔX → _____

- These two quantities are "LINKED" by an equation **(**and **r = *radial distance*, "**radius**"):**

ΔX = _____

- This equation "speaks" _____. Input must be in radians. Output will be in radians. **(_____)**

- One radian is approximately 57°. → To convert between radians and degrees, use:

_____ = ____

EXAMPLE: An object moves along a circle of radius 10 m from 30° above the positive x-axis to 120° above the +x-axis. Calculate the object's **(a)** angular displacement, and **(b)** linear displacement.

DISPLACEMENT IN MULTIPLE REVOLUTIONS

● If you make one full ***revolution*** around a circle**:** **ΔΘ = _____ = _____ → ΔX = _____ = _____.**

- If you make **N** full revolutions**:** **ΔΘ = _____ = _____ → ΔX = _____.**

- To find out how many revolutions you go through**,** simply divide **ΔΘ** by **_____** or **_____.**

- To find out how far from 0^{o} you end up after many revolutions**,** subtract by **360^{o}** until **Θ < 360^{o} (or Θ < 2 π).**

EXAMPLE**:** Starting from 0^{o}, you make two 2.2 revolutions around a circular path of radius 20 m. **(a)** What is your rotational displacement, in degrees**? (b)** How many degrees away from 0^{o} are you? **(c)** What is your linear displacement**?**

PRACTICE: ROTATIONAL DISPLACEMENT

PRACTICE**:** While you drive, your tires, all of radius 0.40 m, rotate 10,000 times. How far did you drive, in meters?

PRACTICE: ROTATIONAL DISPLACEMENT

PRACTICE**:** An object moves a total distance of 1,000 m around a circle of radius 30 m**.**

How many degrees does the object go through**?** → BONUS**:** How many complete revolutions does it make**?**

PRACTICE: ROTATIONAL DISPLACEMENT

PRACTICE**:** A car travels a total of 2,000 m and 1140^{o} around a circular path, starting from **0**^{o}.

What is the radius of the circular path**?** → BONUS**:** How far (in degrees) from 0^{o} does the car end up**?**