

Important Curvilinear Motion Formulas PDF



Formulas Examples with Units

List of 11 Important Curvilinear Motion Formulas

1) Angular Acceleration given Linear Acceleration Formula ↻

Formula

$$\alpha_{\text{cm}} = \frac{a_{\text{cm}}}{r}$$

Example with Units

$$8.1014 \text{ rad/s}^2 = \frac{5.59 \text{ m/s}^2}{0.69 \text{ m}}$$

Evaluate Formula ↻

2) Angular Displacement given Angular Acceleration Formula ↻

Formula

$$\theta_{\text{cm}} = \omega_{\text{in}} \cdot t_{\text{cm}} + \frac{1}{2} \cdot \alpha_{\text{cm}} \cdot t_{\text{cm}}^2$$

Example with Units

$$6187.9442^\circ = 24 \text{ rad/s} \cdot 3 \text{ s} + \frac{1}{2} \cdot 8 \text{ rad/s}^2 \cdot 3 \text{ s}^2$$

Evaluate Formula ↻

3) Angular Velocity given Linear Velocity Formula ↻

Formula

$$\omega = \frac{v_{\text{cm}}}{r}$$

Example with Units

$$36.2319 \text{ rad/s} = \frac{25 \text{ m/s}}{0.69 \text{ m}}$$

Evaluate Formula ↻

4) Angular Velocity of Body Moving in Circle Formula ↻

Formula

$$\omega = \frac{\theta_{\text{cm}}}{t_{\text{cm}}}$$

Example with Units

$$35.9945 \text{ rad/s} = \frac{6187^\circ}{3 \text{ s}}$$

Evaluate Formula ↻

5) Average Angular Velocity Formula ↻

Formula

$$\omega = \frac{\omega_{\text{in}} + \omega_{\text{fi}}}{2}$$

Example with Units

$$36 \text{ rad/s} = \frac{24 \text{ rad/s} + 48 \text{ rad/s}}{2}$$

Evaluate Formula ↻

6) Final Angular Velocity Formula ↻

Formula

$$\omega_{\text{fi}} = \omega_{\text{in}} + \alpha_{\text{cm}} \cdot t_{\text{cm}}$$

Example with Units

$$48 \text{ rad/s} = 24 \text{ rad/s} + 8 \text{ rad/s}^2 \cdot 3 \text{ s}$$

Evaluate Formula ↻



7) Initial Angular Velocity Formula ↻

Formula

$$\omega_{\text{in}} = \omega_{\text{fi}} - \alpha_{\text{cm}} \cdot t_{\text{cm}}$$

Example with Units

$$24 \text{ rad/s} = 48 \text{ rad/s} - 8 \text{ rad/s}^2 \cdot 3 \text{ s}$$

Evaluate Formula ↻

8) Linear Acceleration in Curvilinear Motion Formula ↻

Formula

$$a_{\text{cm}} = \alpha_{\text{cm}} \cdot r$$

Example with Units

$$5.52 \text{ m/s}^2 = 8 \text{ rad/s}^2 \cdot 0.69 \text{ m}$$

Evaluate Formula ↻

9) Radius of Curvilinear Motion given Angular velocity Formula ↻

Formula

$$r = \frac{v_{\text{cm}}}{\omega}$$

Example with Units

$$0.6944 \text{ m} = \frac{25 \text{ m/s}}{36 \text{ rad/s}}$$

Evaluate Formula ↻

10) Radius of Curvilinear Motion given Linear Acceleration Formula ↻

Formula

$$r = \frac{a_{\text{cm}}}{\alpha_{\text{cm}}}$$

Example with Units

$$0.6988 \text{ m} = \frac{5.59 \text{ m/s}^2}{8 \text{ rad/s}^2}$$

Evaluate Formula ↻

11) Velocity in Curvilinear Motion given Angular Velocity Formula ↻

Formula

$$v_{\text{cm}} = \omega \cdot r$$

Example with Units

$$24.84 \text{ m/s} = 36 \text{ rad/s} \cdot 0.69 \text{ m}$$

Evaluate Formula ↻



Variables used in list of Curvilinear Motion Formulas above

- a_{cm} Acceleration For Curvilinear Motion (Meter per Square Second)
- r Radius (Meter)
- t_{cm} Time Period (Second)
- v_{cm} Velocity of Curvilinear Motion (Meter per Second)
- α_{cm} Angular Acceleration (Radian per Square Second)
- θ_{cm} Angular Displacement (Degree)
- ω Angular Velocity (Radian per Second)
- ω_{fi} Final Angular Velocity of Object (Radian per Second)
- ω_{in} Initial Angular Velocity of Object (Radian per Second)

Constants, Functions, Measurements used in list of Curvilinear Motion Formulas above

- **Measurement: Length** in Meter (m)
Length Unit Conversion 
- **Measurement: Time** in Second (s)
Time Unit Conversion 
- **Measurement: Speed** in Meter per Second (m/s)
Speed Unit Conversion 
- **Measurement: Acceleration** in Meter per Square Second (m/s²)
Acceleration Unit Conversion 
- **Measurement: Angle** in Degree (°)
Angle Unit Conversion 
- **Measurement: Angular Velocity** in Radian per Second (rad/s)
Angular Velocity Unit Conversion 
- **Measurement: Angular Acceleration** in Radian per Square Second (rad/s²)
Angular Acceleration Unit Conversion 



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