

## Tangential Velocity

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When the rigid object rotates around in a circle, the linear velocity at a point  $r$  meters away from the center of the circle (with the vector being tangent to the circle) is the tangential velocity. As shown below:

Image

Through substitution and other calculations, the equation below is used to solve for tangential velocity (tangential velocity is equal to the product of radius of circle and angular velocity):

$$v_T = r\omega$$

Note the tangential velocity and angular velocity only refer to its magnitude, and no direction is involved. Also, the angular velocity (speed, since it is the magnitude of velocity) has unit of rad/s. Other units will not work for this equation.

If the tangential velocity changes over a period of time, then tangential acceleration is involved.

Tangential velocity is also related to uniform circular motion.