

Tangential Relationships

Solve the following problems

1. (Walker, p. 301, #25) The hour hand on a certain clock is 8.2 cm long. Find the tangential speed of the tip of this hand.
2. (Walker, p. 301, #27) The outer edge of a rotating Frisbee with a diameter of 29 cm has a linear speed of 3.7 m/s. What is the angular speed of the Frisbee?
3. (Walker, p. 301, #28) A carousel at the local carnival rotates once every 45 seconds. **(a)** What is the linear speed of an outer horse on the carousel, which is 2.75 m from the axis of rotation? **(b)** What is the linear speed of an inner horse, which is 1.75 m from the axis of rotation?
4. (Walker, p. 302, #33) As Tony the fisherman reels in a "big one" he turns the spool on his fishing reel at the rate of 3.0 complete revolutions every second **(a)** If the radius of the reel is 3.7 cm, what is the linear speed of the fishing line as it is reeled in? **(b)** How would your answer to part (a) change if the radius of the reel were doubled?
5. (Walker, p. 302, #34 & 35) A Ferris wheel with a radius of 9.5 m rotates at a constant rate, completing one revolution every 32 s. Find the direction and magnitude of a passenger's acceleration when **(a)** at the top and **(b)** at the bottom of the wheel. **(c)** Suppose the Ferris wheel begins to decelerate at the rate of 0.22 rad/s^2 when the passenger is at the top of the wheel. Find the direction and magnitude of the passenger's acceleration at that time.

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Chapter 7: Rotational motion

12. What is the radius of a car tire that turns with a frequency of 11 Hz and has a linear speed of 20.0 m/s?
13. The earth turns on its axis approximately once every 24 hours. (How many seconds is that?) The radius of the earth is
14. 6.38×10^6 m. If some astronomical catastrophe suddenly brought the earth to a screeching halt (a physical impossibility, as far as we know!), with what linear speed would the earth's inhabitants who live at the equator go flying off the earth's surface?
15. Luigi twirls a round piece of pizza dough overhead with a frequency of 60 revolutions per minute. Find the **linear speed** of a stray piece of pepperoni stuck on the dough 10 cm from the pizza's center. In what **direction** will the pepperoni move if it flies off while the pizza is spinning? Explain your reason for this answer.