1. How many radians is a 10 cm arc of a circle of radius 40 cm?

2. How many degrees is this?

3. A bicycle tire of radius 33 cm moves forward 27 cm. How many radians is this?

4. How many degrees?

5. An object moves 2π radians in 4 seconds. What is its angular velocity?

6. An object moves $3/2\pi$ radians in 12 seconds. What is its angular velocity?

7. An object moving in a circle of radius 0.25 m travels in an arc of 0.75 m in 8 seconds. What is its angular velocity?

8. An object moving in a circle, starts from rest and accelerates to an angular velocity of 12 rad/s in 0.9 s. What is the angular acceleration?

9. An object moving in a circle, starts from rest and accelerates to an angular velocity of 0.25 rad/s in 1.2 s. What is the angular acceleration?

10. A bicycle tire moving at an angular velocity of 3.5 rad/s accelerates to 4.2 rad/s in 3 s. What is the angular acceleration?

11. A bicycle tire of radius 0.3 m has an angular velocity of 2.5 rad/s. What is the linear speed of the bicycle?

12. A bicycle tire of radius 0.25 m has an angular velocity of 3.1 rad/s. What is the linear speed of the bicycle?

13. A bicycle tire of radius 0.35 m has an angular velocity of 4.2 rad/s. What is the linear speed of the bicycle?

14. A bicycle has tires of radius 0.25 m. If the bicycle is traveling at 4 m/s, what is the angular velocity of the tires?

15. A bicycle has tires of radius 0.25 m. If the bicycle is traveling at 1.7 m/s, what is the angular velocity of the tires?

16. A bicycle has tires of radius 0.33 m. If the bicycle is traveling at 5.1 m/s, what is the angular velocity of the tires?

17. A child pushes a merry-go-round with radius 4 m from rest to an angular velocity of 2.5 rad/s in 3s.
    a. What is the angular acceleration?
    b. What is the merry-go-round's tangential acceleration at that time?
    c. What is the merry-go-round's radial acceleration at that time?
    d. What is the merry-go-round's linear acceleration at that time?
    e. What is the frequency of the merry-go-round?

18. A cyclist accelerates from rest to a linear speed of 6 m/s in 4s. If the tires on the bicycle have radius 0.38 m.
    a. What is the angular velocity after accelerating?
    b. What was the tire's angular acceleration?
    c. What is the tire's tangential acceleration at that time?
    d. What is the tire's radial acceleration at that time?
    e. What is the tire's linear acceleration at that time?
    f. What is the frequency of the tire?

Answers:

1. 0.25 radians
2. 14.33 degrees
3. 0.82 radians
4. 47 degrees
5. 1.57 radians
6. 0.39 radians
7. 0.38 rad/s
8. 13.3 rad/s^2
9. 0.21 rad/s^2
10. 0.23 rad/s^2
11. 0.75 m/s
12. 0.78 m/s
13. 1.47 m/s
14. 16 rad/s
15. 6.8 rad/s
16. 15.45 rad/s
17.
    a. 0.83 rad/s
    b. 3.32 rad/s^2
    c. 25 rad/s^2
    d. 25.2 rad/s^2
    e. 0.33 Hz
18.
    a. 15.8 rad/s
    b. 3.9 rad/s^2
    c. 1.5 m/s^2
    d. 94.8 m/s^2
    e. 94.8 m/s^2
    f. 2.5 Hz