

BE PREPARED TO HAND THIS IN ON TEST DAY!

1. An object accelerates uniformly from rest at a rate of  $4.9 \text{ m/s}^2$  for 3.0 s. Find:
  - a. the displacement
  
  
  - b. the final velocity
  
2. A bird of mass 1.6 kg is flying at a speed of 15 m/s. Calculate the kinetic energy of the bird.
  
  
3. A force of 5.35 N acts on a 12.00 kg object for 15.0 s.
  - a. What is the object's change in momentum?
  
  
  - b. What is its change in velocity?
  
  
4. An object was displaced 29.6 m while uniformly accelerating from rest. If the average velocity of the object was 7.00 m/s, what was the rate of acceleration?
  
  
  
  
  
  
  
  
  
  
5. A force of 3.0 N west and a force of 4.0 N  $35^\circ$  south of east act on an object. What is the net force on the object?
  
  
  
  
  
  
  
  
  
  
6. While accelerating uniformly from rest, an object is displaced 15.5 m in 8.15 s. What is the velocity at this time?
  
  
  
  
  
  
  
  
  
  
7. A rabbit is thrown horizontally from the top of a cliff at a velocity of 25.0 m/s. If the rabbit takes 3.40 s to reach the ground, how far from the base of the cliff did the rabbit hit the ground?



8. A 0.45 kg rugby ball is rolling at 5.3 m/s toward a player. The player kicks the ball back in the opposite direction and gives it a velocity of  $-12$  m/s. What is the average force during the interaction between the player's foot and the ball if the interaction lasts  $3.5 \times 10^{-2}$  s?
  
9. An object initially traveling at a velocity of 1.7 m/s accelerates uniformly at a rate of  $2.5$  m/s<sup>2</sup>. During this time of acceleration, the displacement of the object is 27 m. Find the final velocity.
  
10. Sarah, with a mass of 45 kg, is sitting 3 m from her truck which has a mass of 4500 kg. What is the force of attraction between Sarah and her truck?
  
11. An object initially at rest is uniformly accelerated to a velocity of 12.6 m/s in 3.60 s. If during this time the displacement of the object was 21.5 m, what was the rate of acceleration?
  
12. Mike heads his plane with a velocity of 321 km/h south. If there is a strong wind of 175 km/h blowing west, what is the velocity of the plane in reference to the ground?
  
13. An object accelerates uniformly from rest. If it travels 31.0 m and reaches a velocity of 22.0 m/s, how long was the object accelerating?
  
14. A 6.5 kg object is accelerating at a rate of  $5.4$  m/s<sup>2</sup>. What is the magnitude of the net force acting on the object?
  
15. A 924 kg race car accelerates from rest to 120 km/h in 1.20 s.
  - a. What is the change in momentum of the car?
  
  - b. What average force is exerted on the car?



16. An object accelerates uniformly from rest for 9.2 s. If in this time the displacement of the object is 25.4 m, what is the acceleration?
17. What is the acceleration due to gravity near the surface of the moon if an object that has a mass of 45.0 kg has a weight of 29.0 N near the moon's surface?
18. Ball A of mass 3.1 g moves at a velocity of 18.0 cm/s. It collides with ball B of mass 9.6 g moving at a velocity of 12.0 cm/s. After the collision ball A is still moving but with a velocity of 7.0 cm/s.
- What was ball A's original momentum?
  - What is ball A's change in momentum?
  - What is ball B's change in momentum?
  - What is the momentum of ball B after the collision?
19. An object uniformly accelerates at a rate of  $2.00 \text{ m/s}^2$ . While accelerating at this rate, the object is displaced 1524.6 m in a time of 35.0 s. What velocity did this object reach in this time?  
This one is tougher!
20. A boat that can travel on still water at a speed of 2.5 m/s wants to travel north perpendicular to the river current. If the river current is 2.3 m/s west, in what direction must the boat head?
21. What is the mass of an object if it has a weight of 95.0 N near the earth's surface?
22. A 6.4 kg object is pulled along a horizontal surface. If the coefficient of friction between the surfaces is 0.13, what is the force of friction?
23. An object uniformly accelerates from rest and reaches a velocity of 210.0 km/h in 11.6 s. What is the average velocity of the object?



24. What is the potential energy of a 1.6 kg partridge on a branch in a pear tree 1.7m above the ground?
25. A pilot wants to fly east. If the plane has an airspeed of 88 m/s, and there is a 31 m/s wind blowing south, in what direction must the plane head?
26. An object is thrown from the ground into the air at an angle of  $35^\circ$  from the horizontal at a velocity of 21.0 m/s. How far will the object travel horizontally?
27. A 2687 kg van runs into the back of a 965 kg compact car at rest. They move off together at 6.5 m/s. Assuming no friction with the ground, find the initial speed of the van.
28. An object was traveling at an average velocity of 7.90 m/s. If the time of travel was 3.10 s, what was the displacement of the object?
29. A 0.250 kg pine cone falls from a branch 20.0 m above the ground. With what speed will the nest hit the ground if air resistance can be ignored?

1a. 22 m b. 15 m/s 2. 180 J 3a. 80.3 kg·m/s b. 6.69 m/s 4. 3.31 m/s<sup>2</sup> 5. 2.3 N [83° S of E] 6. 3.80 m/s 7. 85.0 m 8. -220 N  
 9. 12 m/s 10.  $2 \times 10^{-6}$  N 11. 3.5 m/s<sup>2</sup> 12. 366 km/h [28.6° W of S] 13. 2.82 s 14. 35 N 15a.  $3.08 \times 10^4$  kg·m/s b.  $2.57 \times 10^4$  N  
 16. 0.60 m/s<sup>2</sup> 17. 0.644 m/s<sup>2</sup> 18a.  $5.6 \times 10^{-4}$  kg·m/s b.  $-3.4 \times 10^{-4}$  kg·m/s c.  $3.4 \times 10^{-4}$  kg·m/s d.  $1.5 \times 10^{-3}$  kg·m/s 19. 78.6 m/s  
 20. [23° N of E] 21. 9.69 kg 22. 8.2 N 23. 105 km/h or 29.2 m/s 24. 27 J 25. [69° E of N] 26. 42 m 27. 8.8 m/s 28. 24.5 m  
 29. 19.8 m/s

