1. A furlong is a distance of 220 yards. A fortnight is a time period of 2 weeks. A race horse is running at a speed of 5 yards per second. What is his speed in furlongs per fortnight?

   a. 27,491 furlongs/fortnight  
   b. 13,674 furlongs/fortnight  
   c. 6,221 furlongs/fortnight  
   d. 2,749 furlongs/fortnight

2. Water flows into a swimming pool at the rate of 8 gal/min. The pool is 16 ft wide, 32 ft long and 8 ft deep. How long does it take to fill? (1 U.S. gallon = 231 cubic inches)

   a. 32 hours  
   b. 64 hours  
   c. 48 hours  
   d. 24 hours

3. The following wind velocities act on a boat: i) 50 m/s at 45° north of east and ii) 25 m/s at 30° south of east. Which of the following represents the magnitude of the resultant (total) boat velocity and its angle relative to the easterly direction?

   a. 75.0 m/s, 7.50°  
   b. 61.4 m/s, 21.8°  
   c. 23.4 m/s, 18.3°  
   d. 12.8 m/s, 37.5°

4. Arvin the Ant travels 30 cm eastward, then 25 cm northward and finally 15 cm westward. What is Arvin’s directional displacement with respect to his original position?

   a. 59° N of E  
   b. 29° N of E  
   c. 29° N of W  
   d. 77° N of E

5. A rock is thrown straight up with an initial velocity of 24.5 m/s. What maximum height will the rock reach before starting to fall downward?

   a. 9.8 m  
   b. 19.6 m  
   c. 24.5 m  
   d. 30.6 m

6. At the top of a cliff 100 m high, Raoul throws a rock upward with velocity 15 m/s. How much later should he drop a second rock from rest so both rocks arrive simultaneously at the bottom of the cliff?

   a. 5.05 s  
   b. 3.76 s  
   c. 2.67 s  
   d. 1.78 s
7. Norma releases a bowling ball from rest; it rolls down a ramp with constant acceleration. After half a second it has traveled 0.75 m. How far has it traveled after two seconds?

a. 1.2 m  
b. 4.7 m  
c. 9.0 m  
d. 12 m

8. A baseball thrown from the outfield is released from shoulder height at an initial velocity of 29.4 m/s at an initial angle of 30° with respect to the horizontal. What is the maximum vertical displacement that the ball reaches during its trajectory?

a. 11.0 m  
b. 9.8 m  
c. 22.1 m  
d. 44.1 m

9. An Olympic downhill skier (mass = 80 kg) races down a 30° slope. If he starts from rest and the track is 50 m long, what is his final velocity at the bottom of the hill?

a. 22.15 m/s  
b. 33.25 m/s  
c. 40.45 m/s  
d. 12.35 m/s

10. A 250 kg crate is placed on an adjustable inclined plane. If the crate slides down the incline with an acceleration of 0.7 m/s² when the incline angle is 25°, then what should the incline angle be for the crate to slide down the plane at constant speed?

a. 12°  
b. 21°  
c. 25°  
d. 29°

11. Two blocks of masses 20 kg and 8 kg touch each other and rest on a frictionless level surface. A person pushes horizontally on the 8 kg box with a force of 14 N. Then what is the contact force between the blocks?

a. 14 N  
b. 6 N  
c. 10 N  
d. 4.0 N