

Total time: 45 min Total Points: 10 pt**Student Name:**

Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page.

- (2 pt) 1. The velocity of an object as a function of time is given by $v(t) = 2.0 + 3.0t - 1.0t^2$. Determine the instantaneous acceleration of the object at time $t = 5.00$ s.

1. _____

Solution: -7.0 m/s^2

- (2 pt) 2. An airplane that is flying level needs to accelerate from a speed of 2.00×10^2 m/s to a speed of 2.40×10^2 m/s while it flies a distance of 1.20 km. What must be the acceleration of the plane?

2. _____

Solution: 7.33 m/s^2

- (2 pt) 3. A rabbit trying to escape a fox runs north for 8.0 m, darts northwest for 1.0 m, then drops 1.0 m down a hole into its burrow. What is the magnitude of the net displacement of the rabbit?

3. _____

Solution: 8.8 m

- (4 pt) 4. A 10-kg crate is pulled along an incline with a force of $F = 60$ N, as shown in Fig. 1. The coefficient of kinetic friction between the incline surface and the box is 0.15.
- (a) 2 pt Draw a free body diagram for the box

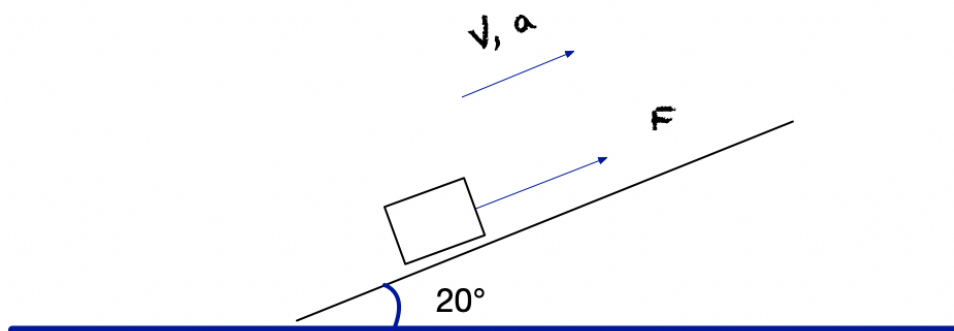


Figure 1: A Box and a Force

- (b) 2 pt What is the magnitude of the Normal force on the box?

(b) _____

Solution: 92.1 N

- (c) (2 pt) What is the acceleration of the box?

(c) _____

Solution: 1.27 m/s^2