

## T12

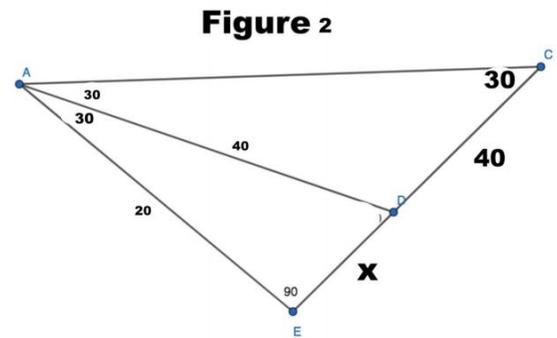
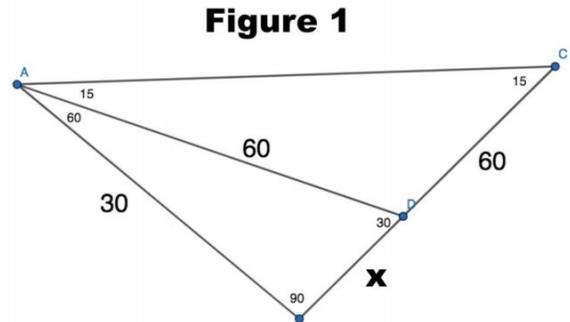
1. A 20 KG crate initially at rest on a horizontal floor requires a 76 N horizontal force to set it in motion. Find the coefficient of static friction between create and the floor. **(a) 0.49 (b) 0.39 (c) .29 (d) .19 (e) None**
2. A student attaches a rope to a 20 kg box of books. He pulls with a force of 100 N at an angle of 45 degree with the horizontal. The coefficient of kinetic friction between the box and sidewalk is .4 Find the weight of the box **(a) 186 kg (b) 196 N (c) 200 N (d) None**
3. A student attaches a rope to a 20 kg box of books. He pulls with a force of 100 N at an angle of 45 degree with the horizontal. The coefficient of kinetic friction between the box and sidewalk is .4. Find Normal Force. **(a) 151 N (b) 125 N (c) 135 N (d) None**
4. A student attaches a rope to a 20 kg box of books. He pulls with a force of 100 N at an angle of 45 degree with the horizontal. The coefficient of kinetic friction between the box and sidewalk is .4. Find Kinetic Friction **(a) 50 N (b) 60 N © 70 N (d) 40 N (e) None**
5. A student attaches a rope to a 20 kg box of books. He pulls with a force of 100 N at an angle of 45 degree with the horizontal. The coefficient of kinetic friction between the box and sidewalk is .4. Find Normal Force. Find acceleration **(a) 2.12 m/s/s (b) 3.85 m/s/s (C) 2.9 m/s/s (d) 1.03 m/s/s (e) None**
6. A crate is pulled to the right (positive x axis) with a force of 80 N, to the left with a force of 84 N, upward with 103 N and downward with 100 N. Find the net force **(a) 3 N (b) 4 N © 5 N (d) 7 N (e) None**
- 7 A crate is pulled to the right (positive x axis) with a force of 80 N, to the left with a force of 84 N, upward with 103 N and downward with 100 N. Find the direction of the Net Force. **(a) 143o clockwise from positive x-axis (b) 96o counter clockwise from positive x-axis (c) 150o clockwise from positive x-axis (d) 143o counter clockwise from positive x-axis**
8. A tractor of mass  $m$  is connected to a trailer by a rope. The rope can carry 4,000 N before it breaks. The trailer accelerates at  $2 \text{ m/s}^2$ . As it drags across the ground, a frictional force of 1,000 N acts in the direction opposite its motion. However, the rope breaks. Using the rope breaking strength of 4,000 N. Find mass. **a. 1500 kg (b) 3000 kg © 2000 kg (d) None**
9. A standing jump would raise Mr. Bari 0.60 m off the ground. To do this, Mr. Bari (100 kg) crouches 0.30 m and pushes off from the ground, exerting a force on it. Find his speed just as he leaves the ground? **(a) 2.4 m/s (b) 2.8 m/s (c) 3.4m/s (d) 1.8 m/s (e) None**
10. A standing jump would raise Mr. Bari 0.60 m off the ground. To do this, Mr. Bari (100 kg) crouches 0.30 m and pushes off from the ground, exerting a force on it. Find his speed just as he leaves the ground? What force must he exert on the ground to perform a 0.60 m jump? **a. 2340 N (b) 3050 N (c) 1823 N (d) 2906 N (e) None**
11. A ball, q, hangs down at an angle, due to the motion of the car. As car accelerates, driver notice the ball hanging down with an angle of  $q = \theta$  o. How fast were driver accelerating? **(a)  $a = \sin \theta g$  (b)  $a = \cos \theta g$  ©  $a = \tan \theta g$  (d)  $a = \cot \theta g$  (e) None**
12. What net force is needed to bring a 1000 Lbs car to rest from a speed of 100 MPH within a distance of 55 m? **a. 8172 N (b) - 10650 N © 7100 N (d) -8172 N (e) None**
13. A 250 gram ball at the end of string is revolving uniformly in a horizontal circle of radius .600 m. The ball makes 4 revolution in a second. Find the centripetal acceleration. **(a) 391 m/s/s (b) 379 m/s/s © 395 m/s/s (d) 397 m/s/s (e) none**

14. A 65 kg woman descends in an elevator that briefly accelerates at  $0.20g$  downward when leaving a floor. She stands on a scale that reads in kg. During this acceleration, what is her weight and what does scale read?  
**(a)  $.2mg$  (b)  $.5mg$  (c)  $.7mg$  (d)  $.8mg$  (e) None**

15. A 65 kg woman descends in an elevator that briefly accelerates at  $0.20g$  downward when leaving a floor. She stands on a scale that reads in kg. what does scale read when the elevator descends at a constant speed of  $2m/s$ ?  
**(a) 650 kg (b) 650 N (c) 65 kg (d) None**

16. State trooper is hidden 30 feet from a straight highway with a speed limit of 65 MPH. One second after a truck passes, the angle  $\theta$  between the highway and the line of observation is  $15^\circ$ . Find the missing side  $x$  (between E and D) from Figure 1:

- (a)  $02 \sqrt{3}$**
- (b)  $03 \sqrt{3}$**
- (c)  $04 \sqrt{3}$**
- (d)  $05 \sqrt{3}$**
- (e) None**



17. State trooper is hidden 20 feet from a straight highway with a speed limit of 65 MPH. One second after a truck passes, the angle  $\theta$  between the highway and the line of observation from the patrol car is  $30^\circ$ . Find the missing side  $x$  (between E and D) from Figure 2:

- (a)  $01 \sqrt{3}$**
- (b)  $52 \sqrt{3}$**
- (c)  $03 \sqrt{3}$**
- (d)  $02 \sqrt{3}$**
- (e) None**

**Extra Credit (5 points):** A light string ABCDE is fixed to a vertical wall at one end A and a load of 20 KGF is hanging freely at other end. If the system is in equilibrium, find the values of and also the tension in the  $w_1$   $w_2$

portion of the string AB, BC and CD. Be sure to write your answer in the back of the scantron.

