

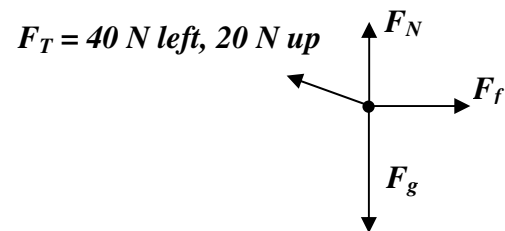
# ZTF Test Review

Name \_\_\_\_\_ Pd \_\_\_\_\_

Draw a system schema and label a force diagram (use complete notation) of the following:

Situation	System Schema	Force Diagram
1. a box lying flat on the floor.		
2. a hockey puck moving at constant velocity across frictionless ice		
3. a car hanging from two cables		
4. a hummingbird hovering in place.		
5. a hockey puck sliding across the floor (yes there is friction)		
6. a football in the air during a kickoff (ignore friction/air resistance)		

7. A frictionless bowling ball is rolled down a frictionless bowling lane. Describe the motion of the ball as it travels down the lane. Also describe the forces as it travels down the lane.
8. Write Newton's 1<sup>st</sup> and 3<sup>rd</sup> laws and give an example of each.
9. A Chevy Silverado pickup truck pulls a trailer with 900N of force which causes it to accelerate. How does the force of the truck on the trailer compare to the force of the trailer on the truck?
10. The same truck comes across a car stuck in a mud pit. The truck slowly pushes the car out of the mud using 800N of force. How does the force of the truck on the car compare to the car on the truck?
11. To the right is a force diagram for an object sliding (via a rope) with constant velocity on a surface. What must be the coefficient of friction?



Draw a **force diagram** and **vector addition diagram** for each of the situations below. Label all forces and quantities.

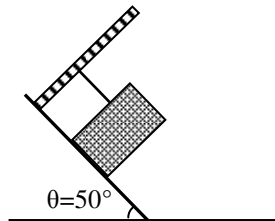
12. 4 kg bowling ball rolls at constant speed without friction

$$\Delta v = \_\_\_ \rightarrow a = \_\_\_ \rightarrow \Sigma F = \_\_\_$$



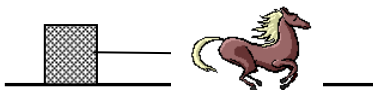
13. The 12 kg box is motionless.

$$\Delta v = \_\_\_ \rightarrow a = \_\_\_ \rightarrow \Sigma F = \_\_\_$$



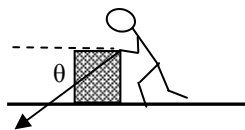
14. The 7 kg box is pulled by a 15 N force parallel to the surface at a constant speed.

$$\Delta v = \_\_\_ \rightarrow a = \_\_\_ \rightarrow \Sigma F = \_\_\_$$

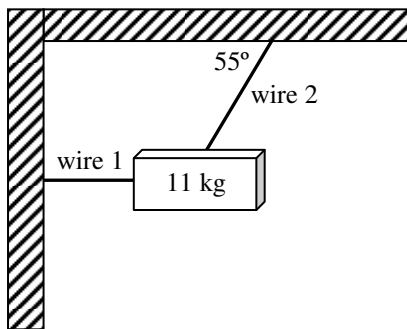


15. A 15kg object is pushed by a 65N force applied downward at an angle. The box doesn't budge.  
The angle between the push and the horizontal = 42°

$$\Delta v = \_\_\_ \rightarrow a = \_\_\_ \rightarrow \Sigma F = \_\_\_$$



16. What tension is necessary in each wire in order to support the object as pictured below? Draw a force diagram and a vector addition diagram.



$F_f = \mu \cdot F_N$	$F_g = g \cdot m$	$\frac{a}{\sin A} = \frac{b}{\sin B}$
-----------------------	-------------------	---------------------------------------

17. Define the following forces (explain how strong it is, what it acts upon, and where it is found):
- a) Strong:
  - b) Electromagnetic:
  - c) Weak:
  - d) Gravity
18. Explain how objects fall differently on the moon compared to the earth. What is the same about how they fall?
19. Why don't things fall off the moon?
20. A box of cereal with a mass of 0.8 kg is placed on a kitchen counter. What force must the counter exert in order to support the box?
21. A jug of water with a mass of 2.0 kg is slid across a kitchen counter. If the coefficient of friction between the jug and the counter is 0.10, then what force of friction must be acting on the carton?
22. Calculate the normal force ( $F_N$ ), force friction ( $F_f$ ), and coefficient of friction ( $\mu$ ) for the following vector addition diagram:

