**PHYSICS 2021 - 22 October 12, 2021**

**Today’s Agenda (Day 34)**

1. HOUSEKEEPING ITEMS

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1. HOMEWORK CHECK:

🡪 Chapter 4 Test Prep Questions

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1. CLASS ACTIVITY

🡪 REVIEW: Chapter 4 Test Prep Questions

🡪 BEGIN: Chapter 5 PPT Review

1. **Section 5.1 – Vectors**
2. Section 5.2 – Friction
3. Section 5.3 – Forces in two dimensions

HOMEWORK:

* READ: Chapter 5 – Motion in Two Dimensions
* COMPLETE: Chapter 5 & 6 Vocabulary
* STUDY: Chapter 5 Test

<http://glencoe.mheducation.com/sites/0078807220/student_view0/self-check_quizzes.html>

Chapter 5 – Forces in Two Dimensions

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| --- | --- | --- | --- |
| Components | Kinetic friction | Coefficient of kinetic friction | Equilibrant |
| Vector resolution | Static friction | Coefficient of static friction |  |

Ch 6 – Motion in Two Dimensions

|  |  |  |
| --- | --- | --- |
| Projectile | Trajectory | Uniform circular motion |
| Centripetal acceleration | Centripetal force | Reference frame |

REMINDERS:

* Chapter 5 & 6 Vocabulary – Oct. 15
* **TEST: Chapter 5 🡪 Oct. 19**
* **QUIZ: Chapter 5 & 6 Vocabulary 🡪 Oct. 21**

**PHYSICS 2021 - 22** TEST PREP

**FORCES IN ONE DIMENSION**

Choose the best answer for each of the following questions. Mark your answers on the answer sheet   
provided by your teacher.

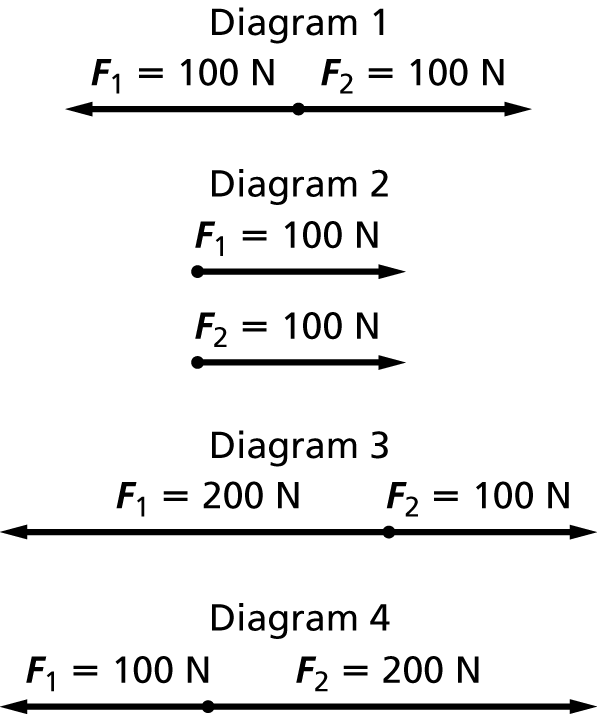
1. Two horizontal forces, one 180.0 N and the other 200.0 N, are exerted in opposite directions on a boat on a lake. What is the magnitude of the net horizontal force on the boat?

2. Two dogs play tug-of-war with a rope toy that has a mass of 0.50 kg. If one dog pulls on the toy with a force of 140.0 N, and the other dog pulls in the opposite direction with a force of 138.0 N, what is the magnitude of the horizontal acceleration of the toy?

3. What is the magnitude of the force of gravity on a person who has a mass of 80.0 kg?

4. A 60.0-kg boy rides in an elevator that accelerates upward at 1.80 m/s2. What is the magnitude of the net force exerted on the boy?

5. The free-body diagrams below show four ways that two different forces could be exerted on an object.



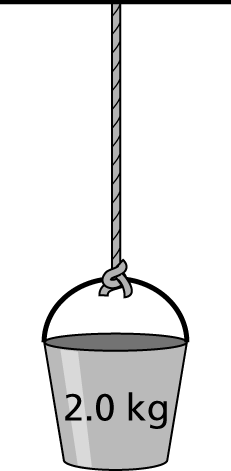
In which diagram is the object in equilibrium?

6. Two teams, the Fifes and the Drums, are playing tug-of-war. Each team has 3 members. Both teams exert a force of 2002 N on the rope. The rope is not accelerating. What is the net force on the rope?

7. Two people are paddling together in a canoe. Each exerts a horizontal force of 238 N toward the back of the canoe. What is the net horizontal force on the canoe?

**8.** Refer to item 7 above. If the combined weight of the canoe and the two paddlers is 190 kg, what is the acceleration of the canoe?

*Use the diagram to answer problems 9 and 10.*



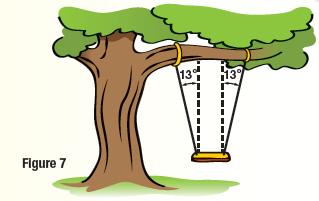
**9.** The figure shows a bucket hanging motionless from a rope. Assume that the rope has no mass. What is the net force on the bucket?

10. What is the tension on the rope?

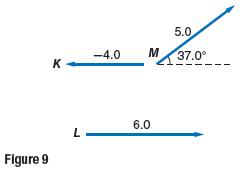
**PHYSICS 2021 - 22** CHAPTER REVIEW

**PRACTICE PROBLEMS 5.1**

1. A car is driven 125.0 km due west then 65.0 km due south. What is the magnitude of its displacement? Solve this problem both graphically and mathematically, and check your answers against each other.
2. Two shoppers walk from the door of the mall to their car. They walk 250.0 m down a lane of cars, and then turn 90° to the right and walk an additional 60.0 m. How far is the shoppers’ car from the mall door? Solve this problem both graphically and mathematically, and check your answers against each other.
3. A hiker walks 4.5 km in one direction then makes a 45° turn to the right and walks another 6.4 km. What is the magnitude of the hiker’s displacement?
4. **Challenge** An ant crawls on the sidewalk. It first moves south a distance of 5.0 cm. It then turns southwest and crawls 4.0 cm. What is the magnitude of the ant’s displacement?
5. Could a vector ever be shorter than one of its components? Could a vector ever be equal in length to one of its components? Explain.
6. Two ropes tied to a tree branch hold up a child’s swing as shown in **Figure 7.**The tension in each rope is 2.28 N. What is the combined force (magnitude and direction) of the two ropes on the swing?

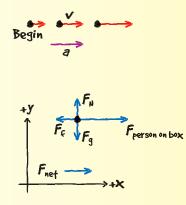


1. **Components of Vectors**Find the components of vectors **K** and **L** in **Figure 9.**



**PRACTICE PROBLEMS 5.2**

1. Gwen exerts a 36-N horizontal force as she pulls a 52-N sled across a cement sidewalk at constant speed. What is the coefficient of kinetic friction between the sidewalk and the metal sled runners? Ignore air resistance.
2. Mr. Ames is dragging a box full of books from his office to his car. The box and books together have a combined weight of 134 N. If the coefficient of static friction between the pavement and the box is 0.55, how hard must Mr. Ames push horizontally on the box in order to start it moving?
3. Thomas sits on a small rug on a polished wooden floor. The coefficient of kinetic friction between the rug and the slippery wooden floor is only 0.12. If Thomas weighs 650 N, what horizontal force is needed to pull the rug and Thomas across the floor at a constant speed?
4. Challenge You need to move a 105-kg sofa to a different location in the room. It takes a 403-N force to start the sofa moving. What is the coefficient of static friction between the sofa and the carpet?
5. You want to move a 41-kg bookcase to a different place in the living room. If you push with a force of 65 N and the bookcase accelerates at 0.12 m/s 2, what is the coefficient of kinetic friction between the bookcase and the carpet?
6. Consider the force pushing the box in Example Problem 4. How long would it take for the velocity of the box to double to 2.0 m/s?



1. Friction At a wedding reception, you notice a boy who looks like his mass is about 25 kg running across the dance floor then sliding on his knees until he stops. If the kinetic coefficient of friction between the boy’s pants and the floor is 0.15, what is the friction force acting on him as he slides?
2. Velocity Dinah is playing cards with her friends, and it is her turn to deal. A card has a mass of 2.3 g, and it slides 0.35 m along the table before it stops. If the coefficient of kinetic friction between the card and the table is 0.24, what was the initial speed of the card as it left Dinah’s hand?