Name _____ Period _____ Date _____

Static Equilibrium

Pre-Test - Post-Test

1. A 10-N force and a 30-N force act on an object in opposite directions. What is the net force on the object?

A) 10 N
B) 20 N
C) 30 N
D) 40 N

2. A 10-N force and a 30-N force act in the same direction on an object. What is the net force on the object?

A) 10 N
B) 20 N
C) 30 N
D) 40 N

3. When you press a coiled spring downward, the spring presses upward on your hand with _____.

A) a smaller amount of force.
B) the same amount of force.
C) a greater amount of force.
D) It can't be determined from the information given.

4. You holds an apple at rest in your outstretched hand. The force you apply in holding the apple still _____.

A) equals the weight of the apple.
B) is slightly more than the weight of the apple.
C) is slightly less than the weight of the apple.
D) is zero, until she drops the apple.

5. The number of forces that act on a book sitting motionless on a table top are

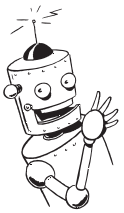
A) one.
B) two.
C) three.
D) none because they cancel to zero.

6. When you stand on two bathroom scales, one foot on each scale with weight evenly distributed, each scale will read _____.

A) your weight.
B) half your weight.
C) zero.
D) actually more than your weight.

7. An object is in motion and traveling at a constant velocity. Which of the following can you conclude from this situation?

A) There are no forces acting on the object.
B) The object can not be in free fall.
C) There is a force acting on the object in the direction of the object's motion.
D) There is no net force acting on the object.



Name _____ Period _____ Date _____

Static Equilibrium

Force and Net Force

1. Describe a force.

2. Describe a net force.

3. How can you change an object's state of motion?

4. What is the difference between force and net force on an object?

5. What is the net force on a box that is being pulled to the right with a force of 40 N and pulled to the left with a force of 30 N?

Supporting Forces

6. What is a normal force?

7. If you placed an ant under a book, does the book squish the ant or does the table squish the ant?

8. A book is at rest. Draw and label all the forces acting on the book

9. When you step on a bathroom scale, does the scale read your weight or the supporting force?

10. You are standing with both feet on a scale. You lift one foot, does the scale read more, less, or the same?

11. If you weigh 150 pounds and distribute your weight equally between two bathroom scales, how much will each scale read?

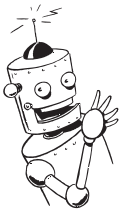
12. What happens to the readings on each scale if you lean with more weight on your left foot?

13. For objects at rest on a horizontal surface, how large is the normal force?

14. What is tension?

15. For an object held at rest by a rope above the ground, what is the tension force equal to?

16. How much tension is in a rope that holds up a 20-N bag of apples at rest?



17. What is the net force on an apple that weighs 1 N when you hold it at rest above your head?

18. What is the net force on it when you release the apple?

Mechanical Equilibrium

19. For objects in equilibrium (not accelerating) the net force must be equal to zero. Express this statement mathematically.

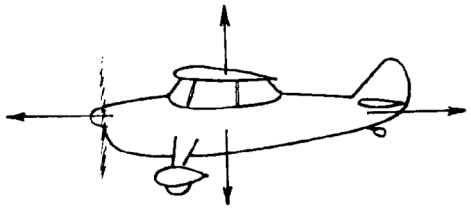
20. Can an object be moving and still be in equilibrium (no net force)? Defend your answer.

21. Distinguish between static equilibrium and dynamic equilibrium.

22. When your car moves along the highway at constant velocity, the net force on it is zero. Why, then, do you keep your foot on the gas?

23. A constant force of 75 N is required to push a crate across the floor at constant speed. Draw a picture of the situation and label all the forces.

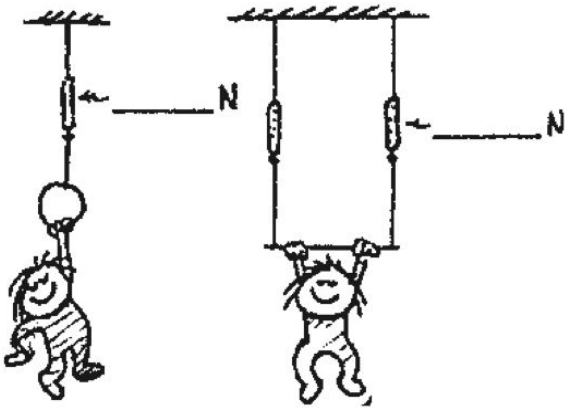
24. An airplane is traveling at constant velocity, on the image below label all the forces.



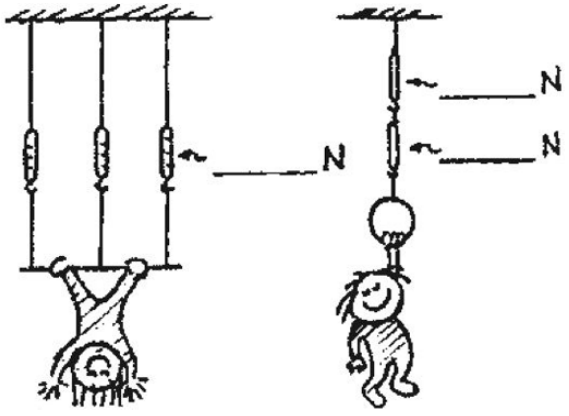
25. If an object has no acceleration, can you conclude that no forces are exerted on it? Explain.

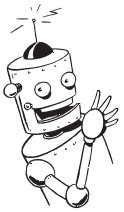
Hanging from Strings

26. Nellie Newton has a weight of 300 N and hangs as shown. What is the tension in each rope?



27. When Nellie Newton hangs as pictured what does the scale read?

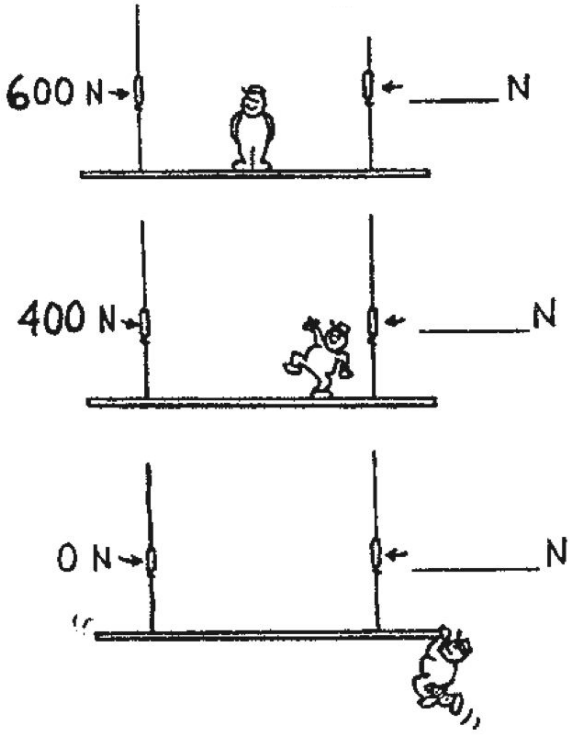




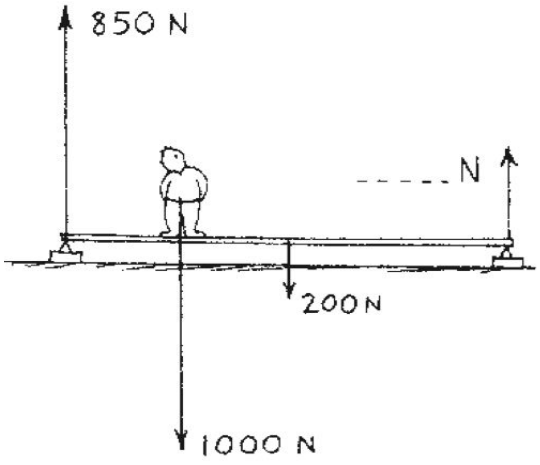
28. When you do pull-ups and you hang at rest, how much of your weight is supported by each arm?

The Window Washer

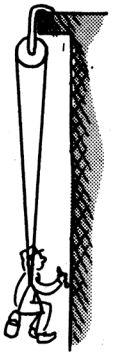
29. Timothy Tension weighs 1200 N and stands on a scaffold as show. Find the reading on each scale.



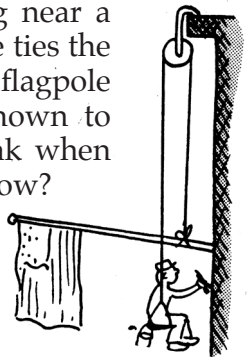
30. Fill in the correct weight reading on the scale.



31. Timothy is washing windows from his bosun's chair. Timothy's weight is 600 N and the rope, unknown to Timothy, has a breaking point of 350 N. Does the rope break when Tim is supported as shown? Explain



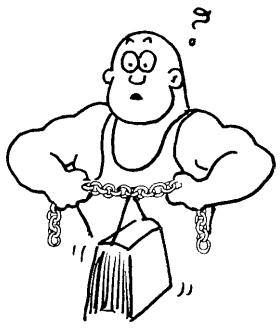
32. One day Timothy is washing near a flagpole, and, for a change, he ties the free end of the rope to the flagpole instead of to his chair as shown to the right. Does the rope break when he is supported as shown below? Explain?



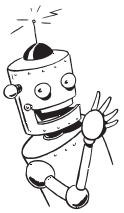
The Tennis Net

33. What happens to the tension in a rope as the angle increases?

34. Can the strong man ever pull hard enough to make the chain perfectly straight? Explain



35. Can you ever tighten a tennis net so tight that it does not sag? Explain



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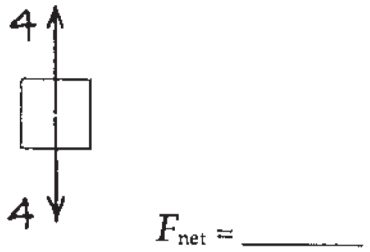
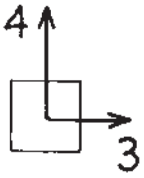


F_{net} = _____

F_{net} = _____



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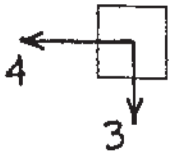

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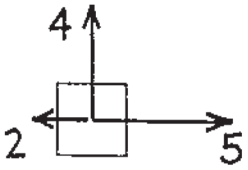

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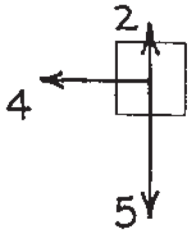

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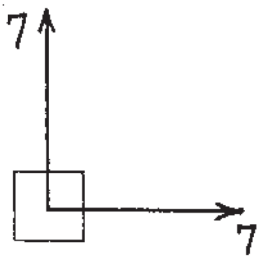

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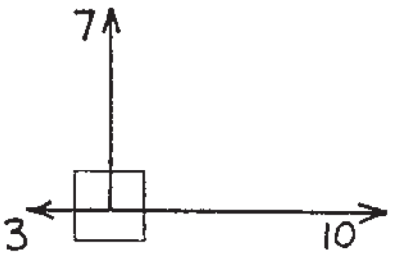

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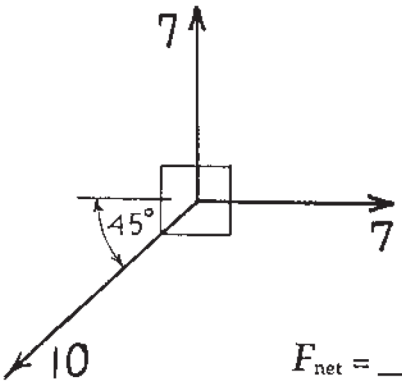

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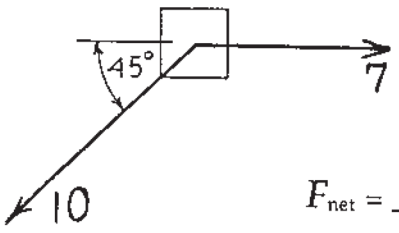

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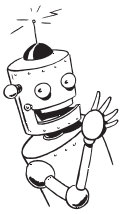

Chapter 4 Static Equilibrium