

Chapter 1-7 Physics Review

DIRECTIONS: Use your notes and textbook to answer the questions below. When answering questions, draw a diagram and then show all of your work including the equation you chose.

Average Speed $v = \frac{d}{t}$ Average Acceleration $\bar{a} = \frac{\Delta v}{\Delta t}$

Linear Motion $v = v_0 + at$ $d = \frac{1}{2}at^2$

Free Fall Equations: $v = v_0 + gt$ $d = \frac{1}{2}gt^2$ $t = \sqrt{\frac{2d}{g}}$

Newton's Second Law $a = \frac{F}{m}$ Pressure $P = \frac{F}{A}$

QUESTIONS:

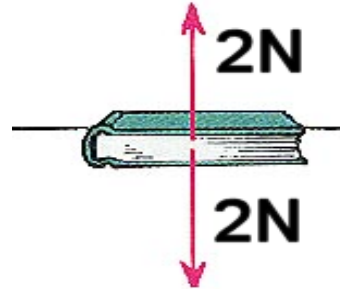
1. Give the units for the following quantities and tell me whether they are a vector or scalar quantity.

Quantity	Units	Vector or Scalar
Distance		
Speed		
Time		
Velocity		
Mass		
Acceleration		
Force		

2. What two things does a **vector** tell us?
3. What one thing does a **scalar** quantity tell us?

4. What is the difference between **speed** and **velocity**?
5. Give me a situation when an object can have constant speed but not constant velocity.
6. What is a **force**?
7. What is **net force**?

8. Diagram the following on the diagram to the right:
- Force of gravity
 - Support or Normal Force
 - What is the net force?



9. The **force of gravity** is also known as
- _____

10. Calculate the **resultant vector** for the following vectors (draw a diagram of each)

a. **200 Newtons down** and **50 Newtons up**

b. **45 Newtons pushing** a crate with **15 Newtons of friction**.

c. A **10 kg** rock falling with **50 Newtons of air resistance**. (Hint: Remember that Force of gravity (F_g) equals **mass x gravity** ($F_g = mg$))

d. A boat rowing across a river at **5 km/hr** with a current flowing at **3 km/hr**.

e. An airplane's groundspeed when it is flying at **250 km/hr** with a **50 km/hr** headwind.

f. An airplane's groundspeed when it is flying at **250 km/hr** with a **50 km/hr tailwind**.

11. What is **friction**? Which way does it always act in relation to the motion of an object?

12. What is **Newton's First Law of Motion**?

13. What is the difference between **mass** and **weight**?

14. What is the difference between **average speed** and **instantaneous speed**?

15. What is the definition of **acceleration**?

16. What is the value of the **acceleration of gravity (g) on Earth**?

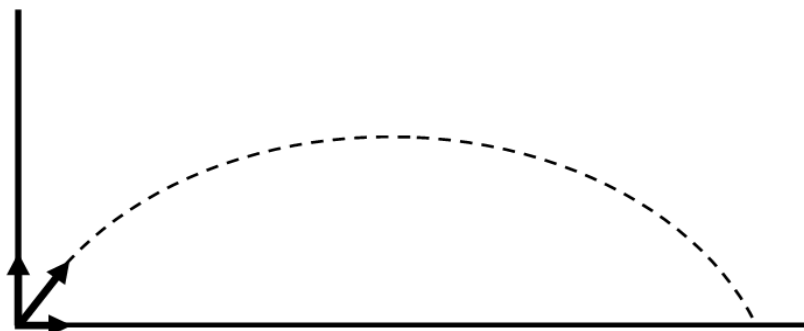
17. What is **free fall**?

18. If you throw an object straight up and it **takes 6 seconds** to return to you, how long did it take to get to the top? From the top of its path back down to you?

19. If you throw a rock straight up at **10 m/s**, what will its speed be when you catch it again?

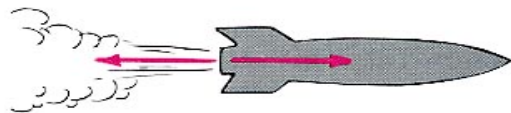
20. What is a **projectile**?

21. Label and diagram below showing the terms and values: **range**, **minimum vertical velocity**, **maximum vertical velocity**, **trajectory**



22. What force causes a projectile to fall short of its idealized path?
23. What *is Newton's Second Law*? Show the equation that summarizes the law.
24. What is meant by *directly proportional*?
25. What is meant by *inversely proportional*?
26. How is *acceleration* and *Force* related? How about *acceleration* and *mass*?
27. What is required to accelerate an object?
28. What is *pressure*?
29. What *is terminal velocity* or speed?
30. What is the *net force* acting on an object that has reached terminal velocity?
31. What is the *acceleration* of an object that has reached terminal velocity?
32. What is *Newton's Third Law*?

33. Label *action* force and *reaction* force in the diagram to the right.



34. How can you compare the two forces in the diagram to the right? How about the acceleration of the gun compared to the bullet? Use $F=ma$ to explain



a. *Forces*-

b. *Accelerations*-

PLUG AND CHUG (Show equation and your work to receive full credit)

35. A bike travels at a constant speed of **5.0 m/s** for **30 seconds**. How far did it travel?

36. How much time will it take for a person to walk the length of a the San Clemente Pier (**400 yards**) at a constant speed of **5 ft/s**?

37. Suppose you take a trip that covers **50 km** and takes **1 hours** to make. What is your average speed?

38. You drop a rock off of a tall building and it hits the ground in **6.0 seconds**. How fast was it going when it hit the ground?

39. You drop a rock off of a tall building. It takes **2.5 seconds** to hit the ground. How tall is the building?

40. You drop a book off the edge of a cliff from a height of **30 meters** above the ground. The book falls freely and hits the ground **4 seconds** later. What is the **average speed** of the book?

41. A cannon with a barrel velocity of **100 m/s** launches a cannonball horizontally from a tower. Neglecting air resistance, how far vertically will the cannonball have fallen after **3 seconds**?

42. A boy pulls on a **15 kg** wagon with a constant force of **4 N**. What is the wagon's acceleration?

43. You drop a rock off of the top of a **65 m** tall building. How long does it take before it hits the ground?

44. A tow truck exerts a force of **15 N** on a car, accelerating it at **1.5 m/s/s**. What is the mass of the car?

45. A car accelerates at **4 m/s²**. Assuming the car starts from rest, how much time does it need to accelerate to a speed of **30 m/s**?

46. If a projectile is fired straight up at a speed of **20 m/s**, the total time to return to its starting point is about