

INQUIRY PHYSICS TEST REVIEW
Units 1-4: One and Two-dimensional Motion

Name _____

Multiple Choice

Covers all topics: 1-d motion, vectors, falling bodies, projectiles.

Be prepared to make or interpret distance or speed graphs of objects for ANY of the motions we have studied, including falling objects and projectiles.

Know your rules of vector addition.

TO PREPARE:

Carefully review all of your notes and review the readings on projectiles.

Study the multiple choice questions on the measurement and motion and vectors quizzes, the projectiles reading worksheet, and do the accompanying review concept questions.

Problems

Be prepared for a projectile problem, a falling body problem, a vector problem, and two 1-d problems with one having multiple steps (where you cannot solve for the answer directly, but must first find another given).

TO PREPARE:

Do the accompanying review problems.

Inquiry Investigations 1-4 Test Review Assignment

Show your work on all problems, including givens, equations, and all appropriate units. Answers should be expressed with the proper number of significant figures. Assume $g = -9.80 \text{ m/s}^2$ and that air resistance is negligible.

1. A stone is thrown straight downward with an initial speed of 8.00 m/s from a height of 25.0 meters.
 - a) Find the time it takes to reach the ground.

 - b) Find its impact velocity.

2. A supersonic airplane was flying horizontally with a speed of 620 m/s when a radar pod fell off. If the pod travelled a horizontal distance of 40,300 m before it struck the ground, what was the altitude of the airplane?

20,700 m

3. How long does it take a car to travel 50.0 m while slowing from 20.0 m/s to a stop?

4. A stone is shot upward with a speed of 20.0 m/s from a tower that is 45.0 m high, and strikes the ground at the tower's base. Find the impact speed of the stone.

5. One summer Mr. M was at the Denver Casa Bonita watching the cliff divers. He saw a diver launch **horizontally** from the 9.00 m tall cliff at approximately 1.20 m/s. How far away from the base of the cliff was the diver when she hit the water?

6. Fluffy the cat decides to swim across the Caney River. The cat paddles due east at 5.0 m/s, and the river has a current of 2.0 m/s due south. Find the **magnitude** and **direction** of Fluffy's resultant velocity (in m/s) by drawing a scale diagram. *5.4 m/s at 22° S of E*



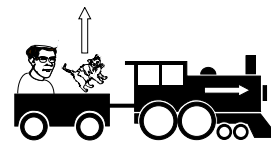
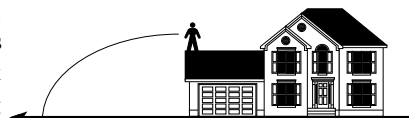
Scale:
1 cm = _____ m/s

Resultant magnitude:
(in m/s)

Resultant direction:
(specify degrees and compass headings)

Write the letter corresponding to the best answer in the blank at the left of each question. Assume air resistance is negligible.

- _____ 7. Which of the following quantities is a vector which changes signs (directions) when an object that was thrown upward stops rising and begins to fall?
 A. velocity B. speed C. acceleration D. time
- _____ 8. A ton of feathers and a ton of bricks are dropped from the same height on the moon. What happens?
 A. The feathers strike the ground first.
 B. The bricks strike the ground first.
 C. The feathers and bricks strike the ground simultaneously.
 D. Nothing hits the ground, because there is no gravity on the moon.
- _____ 9. When an object that was thrown upward reaches its highest point, which statement is true?
 A. The acceleration switches from positive to negative.
 B. The acceleration is zero.
 C. The total displacement is zero.
 D. The velocity is zero.
- _____ 10. A stone is thrown upward from atop a cliff and then lands at the base of the cliff. Which statement is true if the upward direction is considered "positive"?
 A. The initial velocity of the stone is negative.
 B. The acceleration of the stone is positive.
 C. The final velocity of the stone is positive.
 D. The final displacement of the stone is negative.
- _____ 11. Victor Velocity is standing on top of the roof of his house, firing stones with his slingshot over a level field. He is aiming straight outward, horizontally. If Victor pulls back harder on the sling to shoot a stone, which of the following quantities will be changed?
 A. The vertical displacement of the stone.
 B. The distance the stone travels.
 C. The time it takes the stone to strike the ground.
 D. The stone's initial vertical velocity.
- _____ 12. While riding at a constant speed on the train at the Kiddie Park, Mr. M playfully tossed Fluffy straight upward. During the time Fluffy was in the air, the train moved forward one meter. Fluffy landed...
 A. in Mr. M's loving arms.
 B. one meter in front of Mr. M.
 C. one meter behind Mr. M.
 D. several meters behind Mr. M.
- _____ 13. An object is observed and a graph of its distance versus time is constructed. The graph has a slope of +5.00 when the distance is measured in meters and the time is measured in seconds. The object was...
 A. moving at a constant speed of 5.00 m/s.
 B. motionless.
 C. decelerating.
 D. accelerating at 5.00 m/s².
- _____ 14. Neglecting air resistance, when an object is thrown straight up, which of the following quantities is **NOT** the same on the way down as on the way up?
 A. acceleration B. average speed C. velocity D. time of travel



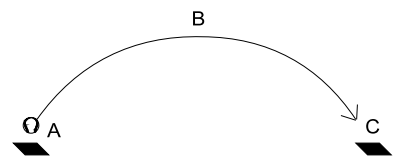
- _____ 15. Three forces simultaneously act on an object. The first is a 5 Newton force acting due east, the second is a 3 Newton force acting due west, and the third is a 4 Newton force acting due east. What is the resultant force?
 A. 12 Newtons east B. 6 Newtons east C. 4 Newtons east D. 2 Newtons west

A stone is tossed straight upward at +9.80 m/s.

- _____ 16. What is its velocity after 1.00 s?
 A. +4.90 m/s B. 0 m/s C. -4.9 m/s D. -9.80 m/s
- _____ 17. What is its displacement after 1.00 s?
 A. +4.90 m B. 0 m C. -4.90 m D. -9.80 m
- _____ 18. What is its acceleration at the top of its rise?
 A. +4.90 m/s² B. 0 m/s² C. -4.90 m/s² D. -9.80 m/s²

Questions 19 - 22 refer to the following situation:

A girl stood at first base on a level playing field and tossed a softball at an angle of 35° above the horizontal. It was caught by another player over home base at the same height above the ground as it was originally thrown.



- _____ 19. At which point along its trajectory was the softball travelling the **fastest**?
 A. Just after it was released.
 B. When it reached its maximum height.
 C. Just before it was caught.
 D. Both A and C are correct if there is no air resistance.
- _____ 20. If the girl threw another softball with the same initial speed, but at 40° above the horizontal, . . .
 A. it would have travelled a smaller horizontal distance.
 B. it would have travelled a larger horizontal distance.
 C. it would have travelled the same horizontal distance.
- _____ 21. What angle of release would make the softball travel as far as possible?
 A. 15° B. 30° C. 45° D. 65°
- _____ 22. What was the softball's **horizontal** acceleration during its flight?
 A. 0 m/s² B. 2.45 m/s² C. 4.90 m/s² D. 9.80 m/s²

23. Draw the graphs for the free-fall motion of the projectile shown at right.

d_v

v_v

d_H

v_H