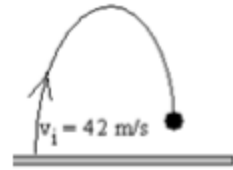


Assignment 6
Acceleration Due to Gravity

Name: _____

1. The picture shows the path of a ball that was thrown vertically into the air from ground level with an initial velocity of +42 m/s. At the position shown, just above ground and coming down, what is the velocity of the ball?

- A) +40 m/s
B) +44 m/s
C) -40 m/s
D) -44 m/s



2. If a ball is thrown vertically upwards at 38 m/s what will be the maximum height reached?

- A) 74 m
B) 186 m
C) 370 m
D) 1400m

3. A ball is thrown vertically upwards. What is the value of the acceleration when it has reached its maximum height?

- A) -9.8 m/s^2
B) 9.8 m/s^2
C) 0 m/s^2
D) unknown

4. If a ball is thrown vertically upwards at 52 m/s, how much time will elapse until it reaches its maximum height?

- A) 5.3 s
B) 10.6 s
C) 21.2 s
D) 13250 s

5. If a ball is thrown with an initial velocity of 28.5 m/s [up], how long will it remain in the air if it returns to its original position?

- A) 2.9 s
B) 5.8 s
C) 9.8 s
D) 29 s

6. An object is thrown vertically upward at 25.0 m/s. What is the object's velocity 3.0 s later?

- A) 22 m/s [down]
B) 22 m/s [up]
C) 4 m/s [up]
D) 4 m/s [down]

7. What was the initial velocity of a rock if it falls into the water 5.2 m below and strikes the water 2.9 s after being thrown?

- A) 7.2 m/s [down]
B) 12 m/s [down]
C) 7.2 m/s [up]
D) 12 m/s [up]

8. An object is thrown vertically upward from the Earth. Before it has reached its maximum height, what is true of its velocity and acceleration?

- A) Its velocity is downward and its acceleration is downward.
B) Its velocity is downward, but its acceleration is upward.
C) Its velocity is upward, but its acceleration is downward.
D) Its velocity is upward and its acceleration is upward.

9. A stone is thrown vertically downward with a speed of 10 m/s from a bridge. Accelerating under gravity (9.8 m/s^2), the stone strikes the water 1.8 s later. From what height above the water was the stone thrown? (Assume 2 significant digits.)

- A) 15 m
B) 27 m
C) 34 m
D) 50 m

10. A ball is thrown vertically downward from a window. Accelerating under gravity, the ball hits the ground 2.6 s later with a speed of 20.0 m/s. From what height above the ground was it thrown?

- A) 19 m
B) 29 m
C) 39 m
D) 85 m

11. Three identical objects are thrown from the same height through a window at the same time. Object A is thrown horizontally at 4.0 m/s, object B is thrown horizontally at 8.0 m/s, and object C is simply dropped. If air resistance is negligible, which object will reach the ground first?
- A) object A
 - B) object B
 - C) object C
 - D) objects B and C will land first and together
 - E) all three will land at the same time
12. A softball is hit straight up and reaches a maximum height of 52 m above the point at which the bat struck the ball. At what speed did the softball leave the bat? {2 marks}
13. A ball is held at rest on a balcony 15.0 m above the ground. The ball is then dropped and falls to the ground. What is the velocity of the ball the instant just before it hits the ground (its impact velocity)? {2 marks}
14. A rock was thrown vertically downward from a bridge over a river. If the rock was released when it was 11.2 m above the water and it took 0.550 s for the rock to reach the water, what was the velocity of the rock when it was released? {3 marks}
15. An arrow is shot straight up in the air from a balcony that is 15.0 m above the ground with an initial velocity of 41.5 m/s.
- a) How much time does it take the arrow to reach its maximum height? {2 marks}
 - b) What is the maximum height **above ground** that the arrow will reach? {3 marks}

16. A rock is thrown upwards at 8.4 m/s from a bridge which is 28 m above the water.
- a) What is the maximum height above the water reached by the rock? {3 marks}
- b) What is the rock's velocity just before it strikes the water below the bridge? {2 marks}
- c) How much time has passed when the rock hits the water? {2 marks}
17. At an amusement park, riders can sit on a chair and be lifted to a height of and then dropped. Mr. Eddy decides to try out this ride during a warm summer day. As Mr. Eddy is being lifted to the top of the ride at a constant speed of 4.5 m/s , he loses his sandal when he is 95.0 m above the ground. How long does it take the sandal to reach the ground? {4 marks}
18. You are standing below a cliff and toss a softball up to your friend who is standing on the edge of the cliff, 8.0 metres above you. The ball goes Up, up, up past your friend who then catches it on the way DOWN. The initial speed of the ball is 30 m/s . At what time will your friend catch the ball on the way down?

19. A rocket is fired vertically upwards with initial velocity 80.0 m/s at the ground level. Its engines then fire and it is accelerated at 4.00 m/s^2 until it reaches an altitude of 1000.0 m . At that point the engines fail and the rocket goes into free-fall (continuing to coast upwards).

a) What is the maximum altitude?

b) What is the velocity just before it collides with the ground?

20. A falling stone takes 0.33 s to pass a window that is 2.6 m high. From what height above the window was the stone dropped from?