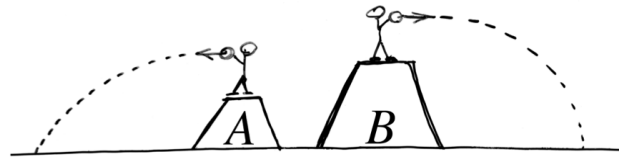


Physics in 2 D Projectiles
Unit 4 Pre-Test

Copy _____

1. Two rocks are thrown from raised platforms of different heights as shown. Since the rocks travel the same distance, you can conclude that...



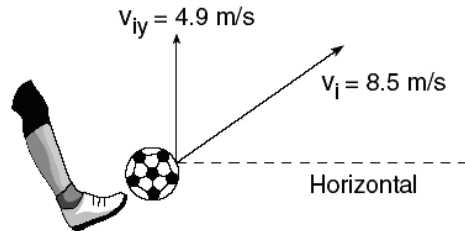
- a. B has a shorter flight time
b. B has a greater initial velocity
c. A has a greater initial velocity
d. A has a longer flight time
2. A marble launched at an angle with an initial speed v_0 . When the marble reaches the highest point the horizontal component of its velocity is:
a. zero b. greater than v_0 c. equal to v_0 d. Less than v_0
3. A ball is thrown horizontally at 12 m/s from the roof of a building 45 m tall. How far from the building does the ball hit the ground?
a. 45 m b. 36 m c. 54 m d. 108 m
4. A cannon fires a shell at a fixed angle above the horizontal. Which one of the following quantities is the same throughout the shell's flight? (Ignore the effects of air friction.)
A. Its speed. B. Its acceleration. C. its velocity.
D. The vertical component of its velocity.
5. A heavy ball is thrown straight down from a tower with an initial velocity of 50 m/s. ($g = 10 \text{ m/s}^2$ down). After 2.0 s the magnitude of its velocity is:
A) 2.5 m/s B) 30 m/s C) 62 m/s
D) 110 m/s E) 70 m/s

6. A baseball is thrown vertically upward into the air. What is the instantaneous acceleration of the ball at its highest point?
- A. 9.8 m/s^2 up. B. zero. C. 9.8 m/s^2 down.
D. changing from 9.8 m/s^2 up to 9.8 m/s^2 down.
7. A projectile is fired at an angle of 45° above the horizontal. Assume that air resistance is not significant. While the projectile is in flight, the horizontal component of the velocity remains constant.
- A. False B. True
8. A ball moving with an initial velocity of 100 m/s north is given an acceleration of 10 m/s^2 south. What will its velocity be after 6.0 s ?
- A. 60 m/s north B. 40 m/s north
C. 40 m/s south D. 60 m/s south
9. A 5.0 kg sphere initially at rest is allowed to fall toward the earth for a time of 5.0 s ($g = 10 \text{ m/s}^2$). Its velocity at the end of this time is:
- A) 10 m/s down B) 20 m/s down C) 30 m/s down
D) 40 m/s down E) 50 m/s down
10. A projectile is fired at an angle of 45° above the horizontal. Assume that air resistance is not significant. While the projectile is in flight, the acceleration remains constant.
- A. False B. True
11. A soccer player kicks a ball with an initial velocity of $10. \text{ meters per second}$ at an angle of $30.^\circ$ above the horizontal. The magnitude of the horizontal component of the ball's initial velocity is
- (A) 5.0 m/s (B) 8.7 m/s (C) 9.8 m/s (D) $10. \text{ m/s}$
12. A machine launches a tennis ball at an angle of 25° above the horizontal at a speed of $14 \text{ meters per second}$. The ball returns to level ground. Which combination of changes *must* produce an increase in time of flight of a second launch?
- (A) decrease the launch angle and decrease the ball's initial speed
(B) decrease the launch angle and increase the ball's initial speed
(C) increase the launch angle and decrease the ball's initial speed
(D) increase the launch angle and increase the ball's initial speed

13. A golf ball is propelled with an initial velocity of 60. m/s at 37° above the horizontal. The horizontal component of the golf ball's initial velocity is
- (A) 30. m/s (B) 36 m/s (C) 40. m/s (D) 48 m/s
14. A projectile is fired with an initial velocity of 120.0 m/s at an angle, θ , above the horizontal. If the projectile's initial horizontal speed is 55 meters per second, then angle θ measures approximately
- (A) 13° (B) 27° (C) 63° (D) 75°
15. A golf ball is hit at an angle of 45° above the horizontal. What is the acceleration of the golf ball at the highest point in its trajectory? [Neglect friction.]
- (A) 9.8 m/s^2 upward (B) 9.8 m/s^2 downward
(C) 6.9 m/s^2 horizontal (D) 0.0 m/s^2
16. A ball is thrown horizontally at a speed of 24 meters per second from the top of a cliff. If the ball hits the ground 4.0 seconds later, approximately how high is the cliff?
- (A) 6.0 m (B) 39 m (C) 78 m (D) 96 m
17. A 0.2-kilogram red ball is thrown horizontally at a speed of 4 meters per second from a height of 3 meters. A 0.4-kilogram green ball is thrown horizontally from the same height at a speed of 8 meters per second. Compared to the time it takes the red ball to reach the ground, the time it takes the green ball to reach the ground is
- (A) one-half as great (C) the same
(B) twice as great (D) four times as great
18. A ball is thrown at an angle of 38° to the horizontal. What happens to the magnitude of the ball's vertical acceleration during the total time interval that the ball is in the air?
- (A) It decreases, then increases.
(B) It decreases, then remains the same.
(C) It increases, then decreases.
(D) It remains the same.

Base your answers to questions 19 and 20 on the information and diagram below.

A child kicks a ball with an initial velocity of 8.5 meters per second at an angle of 35° with the horizontal, as shown. The ball has an initial vertical velocity of 4.9 meters per second and a total time of flight of 1.0 second. [Neglect air resistance.]



19. The horizontal component of the ball's initial velocity is approximately
- a. 3.6 m/s b. 4.9 m/s c. 7.0 m/s d. 13 m/s
20. The maximum height reached by the ball is approximately
- a. 1.2 m b. 2.5 m c. 4.9 m d. 8.5 m
21. What displacement must be added to a 50 cm displacement in the +x-direction to give a resultant displacement of 85 cm at 25 degrees?
- a. 69 cm at 90° c. 45 cm at 37°
b. 62 cm at 82° d. 45 cm at 53°
22. What displacement at 70° has an x-component of 450 m? What is its y-component?
- A. (a) 1.3 km, (b) 1.2 km B. (a) 0.48 km, (b) 0.16 km
C. (a) 0.15 km, (b) 0.45 km D. (c) 0.42 km, (b) 0.42 km
23. A marble, rolling with speed 20 cm/s, rolls off the edge of a table that is 80 cm high. (a) How long does it take to drop to the floor? (b) How far, horizontally, from the table edge does the marble strike the floor?
- A. (a) 4.0 s, (b) 4.0 cm B. (a) 8.2 s, (b) 0.8 cm
C. (a) 0.16 s, (b) 3.2 cm D. (a) 0.40 s, (b) 8.1 cm

