Angle Projectiles

Name: _______________________________  Date: __________

Class:  __________

1. The diagram here represents a ball being kicked by a foot and rising at an angle of 30° from the horizontal. The ball has an initial velocity of 5.0 meters per second. [Neglect friction.]

What is the magnitude of the horizontal component of the ball’s initial velocity?

(1) 2.5 m/s  (2) 4.3 m/s  
(3) 5.0 m/s  (4) 8.7 m/s

2. As the ball rises, the vertical component of its velocity

(1) decreases  
(2) increases  
(3) remains the same

3. If the angle between the horizontal and the direction of the 5.0-meters-per-second velocity decreases from 30° to 20°, the horizontal distance the ball travels will

(1) decrease  
(2) increase  
(3) remain the same

4. Base your answer(s) to the following question(s) on the diagram which shows a ball thrown toward the east and upward at an angle of 30° to the horizontal. Point X represents the ball’s highest point.

An object is thrown horizontally off a cliff with an initial velocity of 5.0 meters per second. The object strikes the ground 3.0 seconds later. What is the vertical speed of the object as it reaches the ground? [Neglect friction.]

(1) 130 m/s  (2) 29 m/s  
(3) 15 m/s  (4) 5.0 m/s
5. An object is thrown horizontally off a cliff with an initial velocity of 5.0 meters per second. The object strikes the ground 3.0 seconds later. How far from the base of the cliff will the object strike the ground? [Neglect friction.]

(1) 2.9 m  (2) 9.8 m  (3) 15 m  (4) 44 m

6. An object is thrown horizontally off a cliff with an initial velocity of 5.0 meters per second. The object strikes the ground 3.0 seconds later. What is the horizontal speed of the object 1.0 second after it is released? [Neglect friction.]

(1) 5.0 m/s  (2) 10 m/s  (3) 15 m/s  (4) 30 m/s

7. The diagram here shows a ball thrown toward the east and upward at an angle of 30° to the horizontal. Point X represents the ball’s highest point. What is the direction of the ball’s velocity at point X? [Neglect friction.]

(1) down  (2) up  (3) west  (4) east

8. What is the direction of the ball’s acceleration at point X? [Neglect friction.]

(1) down  (2) up  (3) west  (4) east

9. A cannon fires a projectile at an angle with the horizontal. The horizontal component of the projectile’s initial velocity is 866 meters per second and its initial vertical component is 500 meters per second. [Neglect air resistance.] What is the shape of the path that the projectile will follow?

(1) circular  (2) straight  (3) hyperbolic  (4) parabolic

10. After 5.00 seconds, what is the vertical component of the projectile’s velocity?

(1) 549 m/s  (2) 500 m/s  (3) 451 m/s  (4) 49.0 m/s

11. The maximum height to which the projectile rises is approximately

(1) $2.50 \times 10^3$ m  (2) $1.28 \times 10^4$ m  (3) $1.54 \times 10^4$ m  (4) $4.42 \times 10^4$ m
12. The diagram shows a baseball being hit with a bat. Angle $\theta$ represents the angle between the horizontal and the ball’s initial direction of motion. Which value of $\theta$ would result in the ball traveling the longest horizontal distance? [Neglect air resistance.]

(1) 25°  (2) 45°  (3) 60°  (4) 90°

13. A cannon elevated at an angle of 35° to the horizontal fires a cannonball, which travels the path shown in the diagram. [Neglect air resistance and assume the ball lands at the same height above the ground from which it was launched.]

If the ball lands $7.0 \times 10^2$ meters from the cannon 10 seconds after it was fired, what is the horizontal component of its initial velocity?

(1) 70 m/s  (2) 49 m/s
(3) 35 m/s  (4) 7.0 m/s

14. If the ball’s time of flight is 10 seconds, what is the vertical component of its initial velocity?

(1) 9.8 m/s  (2) 49 m/s
(3) 70 m/s  (4) 98 m/s

15. If the angle of elevation of the cannon is decreased from 35° to 30°, the vertical component of the ball’s initial velocity will

(1) decrease and its horizontal component will decrease
(2) decrease and its horizontal component will increase
(3) increase and its horizontal component will decrease
(4) increase and its horizontal component will increase
16. Projectiles are fired from different angles with the same initial speed of 14 meters per second. The graph shows the range of the projectiles as a function of the original angle of inclination to the ground, neglecting air resistance.

The graph shows that the range of the projectiles is

(1) the same for all angles
(2) the same for angles of 20° and 80°
(3) greatest for an angle of 45°
(4) greatest for an angle of 90°
1. Answer: 2
2. Answer: 1
3. Answer: 1
4. Answer: 2
5. Answer: 3
6. Answer: 1
7. Answer: 4
8. Answer: 1
9. Answer: 4
10. Answer: 3
11. Answer: 2
12. Answer: 1
13. Answer: 1
14. Answer: 2
15. Answer: 2
16. Answer: 3