

Vectors/Projectiles practice.

1. A vector is a quantity that has what two characteristics?
2. A scalar is a quantity that only has what characteristic?
3. What does the length of a velocity vector represent?
4. What are two examples of projectiles?
5. Does the horizontal component of a projectile depend on the vertical component?
6. True or false: In the absence of air friction, the horizontal component of a projectile's velocity does not change as the projectile moves.
7. At the instant a ball is thrown horizontally with a large force, an identical ball is dropped from the same height. Which ball hits the ground first?
8. A ball is thrown into the air at some angle. Does the ball have any vertical velocity at the top of its path?
9. At what angle, in the absence of air resistance, will a thrown ball go the farthest?
10. Why will a thrown ball never go as far as physics ideally would predict?
11. At what part of a path does a projectile have minimum speed?
12. A cannonball is launched from the ground at an angle of 30° and a speed of 20 m/s. Ideally, (no air resistance) the ball will land on the ground with what speed?
13. A bullet fired horizontally hits the ground in 0.5 seconds. If it had been fired with a much higher speed in the same direction, it would have hit the ground (neglecting the earth's curvature and air resistance) in _____.
14. A projectile is fired horizontally in a vacuum. Why does the projectile maintain its horizontal component of speed?
15. An object is dropped and falls freely to the ground with an acceleration of 1 g. What would its acceleration be if it is thrown upward at an angle instead?
16. A rifle with a muzzle velocity of 100 m/s is fired horizontally from a tower. Neglecting air resistance, where will the bullet be 1 second later?
17. What is the acceleration at the top part of the flight of a rock?
18. Circle the correct response. An airplane flying into a head wind loses ground speed, and an airplane flying with the wind gains ground speed. If an airplane flies at right angles to the wind, the ground speed is more, less or unchanged.
19. Jose can jump vertically 1 meter from his skateboard when it is at rest. Could Jose jump higher if the skateboard is moving horizontally?
20. What is the resultant magnitude of a pair of 10 N vectors at right angles to each other?
21. What is the resultant magnitude of a 4-unit vector and a 3-unit vector at right angles to each other?
22. When in orbit, is the Space Shuttle a projectile?
23. Suppose a small plane can fly at 200 km/h relative to the surrounding air. Suppose also that there is a 40-km/h tailwind. How fast does the shadow of the plane move across the ground?
24. A ball is thrown straight upward at 20 m/s. Ideally (no air resistance), the ball will return to the thrower's hand with what speed?