

ANSWERS TO EVEN-NUMBERED CONCEPTUAL QUESTIONS

2. The components of a vector will be equal in magnitude if the vector lies at a 45° angle with the two axes along which the components lie.
4. The minimum sum for two vectors occurs when the two vectors are opposite in direction. If they are unequal, their sum cannot be zero.
6. The balls will be closest at the instant the second ball is projected. The first ball will always be going faster than the second ball. There will be a one second time interval between their collisions with the ground. The two move with the same acceleration in the vertical direction. Thus, changing their horizontal velocity can never make them hit at the same time.
8. The equations of projectile motion are only valid for objects moving freely under the influence of gravity. The only acceleration such an object has is the free-fall acceleration, g , directed vertically downward. Of the objects listed, only a and d meet this requirement.
10. The passenger sees the ball go into the air and come back in the same way he would if he were at rest on Earth. An observer by the tracks would see the ball follow the path of a projectile. If the train were accelerating, the ball would fall behind the position it would reach in the absence of the acceleration.