

wk.10.practice.quiz

1. A projectile is shot off of a cliff that is 250 m high with a velocity of 200 m/s. If the angle is zero, perfectly horizontal,

(a) How long does it take for the projectile to reach the ground?

(b) How far from the base of the cliff does the projectile land?

(c) What is its horizontal velocity just before it hits the ground?

(d) What is its vertical velocity just before it hits the ground?

(e) What is its net velocity (magnitude and angle) just before it strikes the ground?

2. A projectile is shot off a cliff that is 250 m high with a velocity of 200 m/s at an angle of 45° above horizontal.

(a) How long does it take for the projectile to reach the ground?

(b) How far from the base of the cliff does the projectile land?

(c) To what maximum height (above the ground) does it rise?

(d) What is its horizontal velocity just before it hits the ground?

(e) What is its vertical velocity just before it hits the ground?

(f) What is its net velocity (magnitude and angle) just before it strikes the ground?

3. A projectile is shot at a velocity of 50 m/s at an angle of 15° above horizontal. It lands in the same field at the same height as it was initially launched from.

(a) How far from its initial position does it land (Its Range)?

(b) Given the same magnitude of initial velocity, what other launch angle would give the same range (If the initial and final height were the same)?

4. A baseball batter hits a ball with a velocity of 60 m/s at an angle of 30° above horizontal. If the homerun fence is 390 ft from the plate ($3.28 \text{ ft} = 1 \text{ meter}$) and the baseball is 1.0 m above the ground when the batter hits it

(a) How long does it take for the ball to reach the fence?

(b) How far above the ground is the ball when it reaches the fence?

(c) To what maximum height does the ball rise above the ground?

5. A policeman is chasing a bad guy across a group of buildings. The distance from one building to the next is 7.0 m and the building the bad guy is running from is 4.5 meters higher than the building he is jumping to. If the bad guy jumps at an angle of 30° above horizontal

(a) How long does it take him to reach the other building?

(b) At what minimum velocity must he be running at before he jumps?

1. (a) 7.1 s (b) 1.4×10^3 m (c) 200 m/s (d) -70 m/s (e) 212 m/s at -19°
2. 30 s (b) 4.3×10^3 m (c) 1.3×10^3 m (d) 141 m/s (e) -158 m/s (f) 212 m/s at -48 m/s
(Notice that the magnitude of the net velocity is the same no matter what the difference is in the launch angle)
3. (a) 128 m (b) 75° (the complement of 15°)
4. (a) 2.3 s (b) 44 m (c) 47 m
5. (a) 1.32 s (b) 6.12 m/s