Projectiles – Practice

You can ignore the effect of air resistance in all these questions.
You can assume that the ground is level and horizontal.

1. A cannon ball is fired horizontally at a speed of 50 m/s from the top of a cliff, 60 m above the sea. Calculate:

    (a) the time it takes for the cannon ball to hit the sea, *(3.5 s)*

    (b) the distance from the base of the cliff that it hits the sea. *(175 m)*

2. An air rifle pellet is fired horizontally at a speed of 60 m/s at a target which is at a horizontal distance of 15 m. Calculate:

    (a) the vertical distance that the pellet has fallen when it hits the target, *(0.31 m)*

    (b) the angle to the horizontal at which it hits the target. *(2.3°)*

3. A transport plane, flying at a steady speed of 50 m/s at an altitude of 300 m, releases a parcel when directly above a point X on the ground. Calculate:

    (a) the time of flight of the parcel *(7.8 s)*

    (b) the distance from X to the point of impact. *(390 m)*

    (c) the speed of impact of the parcel on the ground. *(91 m/s)*

4. A ball is projected horizontally with velocity *v* from a point 24 m above the ground.

    (a) Calculate the time it takes to reach the ground. *(2.2 s)*

    (b) It hits the ground 11m horizontally from the point of projection. Calculate the value of *v*, the initial velocity. *(5.0 m/s)*

5. A javelin is thrown on horizontal ground with a velocity which has a vertical component of 11 m/s and a horizontal component of 12 m/s. Calculate:

    (a) the maximum height which the javelin reaches, *(6.2 m)*

    (b) the time it takes to reach this maximum height, *(1.12 s)*

    (c) the horizontal distance it travels before hitting the ground. *(27 m)*

6. A golfer is hits a ball at a velocity of 40 m/s at 50° above the horizontal. Calculate the distance the ball will travel before hitting the ground. *(161 m)*
    (hint: you could use the same steps as the previous question)