PHYSICS 12 PROJECTILE MOTION WORKSHEET 2

1. A rock is thrown horizontally from a cliff at 25 m/s.
    a) What will its horizontal and vertical velocities be after 2.0 s?
    b) What will its velocity be (magnitude and direction) after 3.0 s?
    c) What will its displacement be after 3.0 s?

2. A ball is projected horizontally with velocity 'v' m/s from a point 245 m above the ground.
    a) How long does it take to reach the ground?
    b) If it strikes the ground 84 m horizontally from the point of projection, what is
       the value of **v**?

3. A boy standing on top of a hill throws a stone horizontally. The stone hits the ground
    at the foot of the hill 2.5 s later. How high is the hill?

4. A projectile is shot upward at a 60° angle with the ground at 65 m/s.
    a) What are the vertical and horizontal components of its velocity?
    b) How far has the projectile gone horizontally after 4.0 seconds?

5. The muzzle velocity of a projectile fired from a gun has an upward component of 49 m/s
    and a horizontal component of 60 m/s.
    a) What maximum height does the projectile reach?
    b) How far forward does it go? (assume a level surface)

6. A bullet is fired from a height of 45 m and hits the ground 2000 m away. With what
    velocity does the bullet leave the gun?

7. A projectile is fired at 12.5 m/s at an angle of 53.1° with the horizontal from a point 75.0 m
    above the ground.
    a) How long does it take to reach the ground?
    b) What maximum height does it reach?
    c) What horizontal distance does it travel before striking the ground?
    d) With what velocity does it strike the ground?

8. A projectile is fired at an angle θ above the horizontal from a point 80 m above the ground.
    If the vertical component of the initial velocity is 30 m/s upwards,
    a) how long does the projectile take to land?
    b) calculate the angle θ if the projectile travels 576 m.

9. A stone is projected upwards at 30° to the horizontal from a point 175 m above the ground,
    with initial velocity 20 m/s.
    a) How long does the stone take to reach the ground?
    b) What is the range of the projectile?
    c) What is the velocity of the object when it strikes the ground?

1 a) 25 m/s, 19.6 m/s down b) 38.6 m/s @ 49.6° down c) 87 m @ 30.5° down   2 a) 7.1 s b) 12 m/s 3. 31 m

4. a) 32.5 m/s, 56 m/s b) 130 m   5. a) 123 m b) 600 m   6. 660 m/s   7. a) 5.1 s b) 80 m c) 38 m
d) 40.3 m/s @ 79.3° down   8. a) 8.1 s b) 23°   9. a) 7.1 s b) 122 m c) 62 m/s @ 74° down