

41**Horizontal Projectile Problems**

Show ALL work including givens, formula, final answer and units.

$$d = vt \quad v_f = v_i + at \quad d = v_i t + (1/2)at^2 \quad g = 9.8 \text{ m/s}^2$$

1) A bullet is fired horizontally from a height of 3.0 m at a speed of 400 m/s. How long does it take to land?

What is the bullet's range?

A second bullet is dropped from the same height. How long does it take to land?

2) A rock is thrown horizontally off a cliff. It hits the ground 3.5 s later at a distance of 100 m from the bottom of the cliff. What is the height of the cliff?

What was the initial velocity of the rock?

3) A soccer ball is kicked horizontally from a height of 10 m at a speed of 15 m/s. How long does it take to land?

What is its range?

A second soccer ball is dropped from the same height. How long does it take to land?

4) An arrow is fired horizontally off a platform. It hits the ground 1.2 seconds later at a distance of 90 m from the bottom of the cliff. What is the height of the platform?

What was the initial velocity of the arrow?

5) A (fill in with a noun) _____ is fired horizontally from a tower that is 35 m high. It lands 80 m from the bottom of the tower. How long did it take to land?

What was the initial speed of the _____ ?

6) A horizontally fired projectile has a range of 300 m and was fired from a height of 50 m. How long did it take to land?

What was its initial speed?

1) 0.78 s 312 m 0.78 s 2) 60 m 28.6 m/s 3) 1.4 s 21 m 1.4 s 4) 7.06 m 75 m/s 5) 2.7 s 29.6 m/s 6) 3.2 s 93.8 m/s