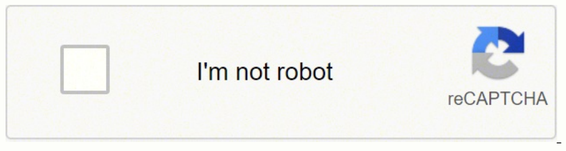

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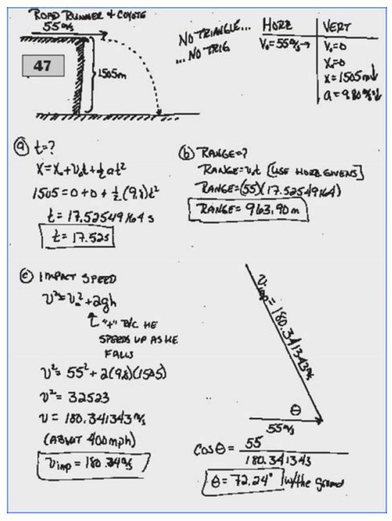
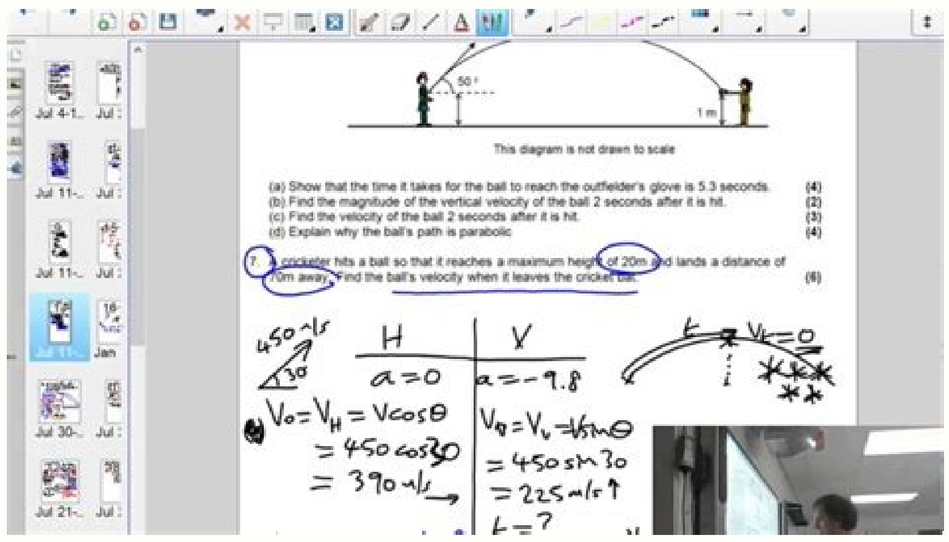
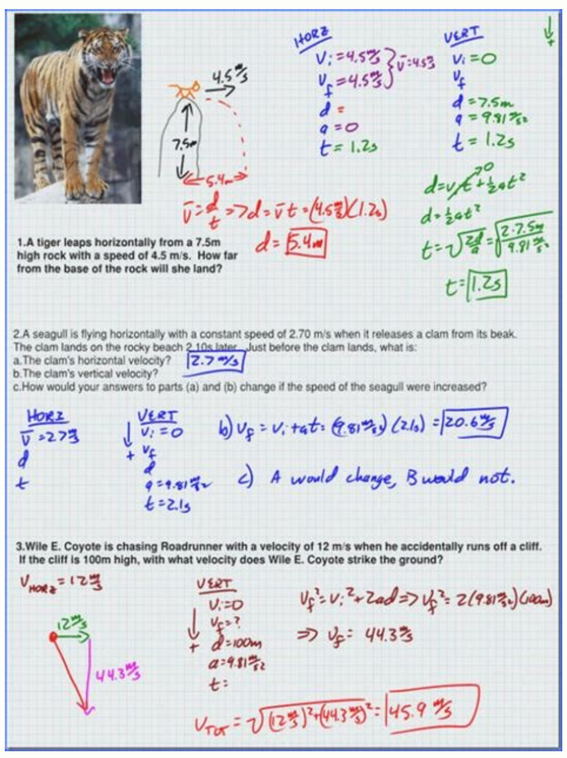
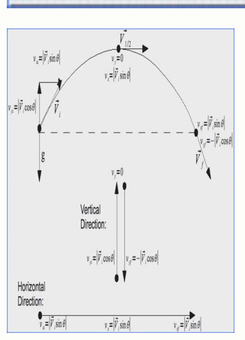
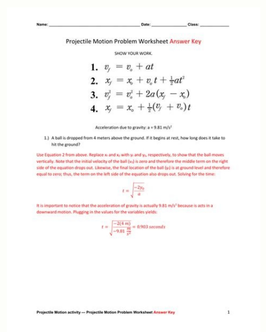
Horizontal projectile motion problems answers











Name: _____ Date: _____ Class: _____

Projectile Motion Problem Worksheet Answer Key

SHOW YOUR WORK.

1. $v_f = v_i + at$
2. $x_f = x_i + v_i t + \frac{1}{2}at^2$
3. $v_f^2 = v_i^2 + 2a(x_f - x_i)$
4. $x_f = x_i + \frac{1}{2}(v_f + v_i)t$

Acceleration due to gravity: a = 9.81 m/s²

1.) A ball is dropped from 4 meters above the ground. If it begins at rest, how long does it take to hit the ground?

Use Equation 2 from above. Replace x_i and x_f with y_i and y_f, respectively, to show that the ball moves vertically. Note that the initial velocity of the ball (v_i) is zero and therefore the middle term on the right side of the equation drops out. Likewise, the final location of the ball (y_f) is at ground level and therefore equal to zero; thus, the term on the left side of the equation also drops out. Solving for the time:

$$t = \sqrt{\frac{-2y_i}{a}}$$

It is important to notice that the acceleration of gravity is actually 9.81 m/s² because is acts in a downward motion. Plugging in the values for the variables yields:

$$t = \sqrt{\frac{-2(4\ m)}{-9.81\ \frac{m}{s^2}}} = 0.903 \text{ seconds}$$

Projectile Motion activity — Projectile Motion Problem Worksheet Answer Key 1

Horizontal projectile motion practice problems with answers. Horizontal projectile motion practice problems with answers pdf.

It has a velocity of 49 m/s. a) How high will it go? The ball is lobbed to a teammate at 8 m/s at an angle of 40°. Ball has is pushed so that its initial velocity is 10 m/s and ball B is pushed so that its initial velocity is 15 m/s.a) Find the time it takes each ball to hit the ground.b) What is the difference in the distance between the points of impact of the two balls on the ground? It takes 7.0 seconds to hit the ground, find: a) height of the cliff b) final vertical velocity c) range A ship fires its guns with a speed of 400 m/s at an angle of 35° with the horizontal. Answers: 1) 40 m 2) a) 32 m b) 2.2 x 102 m 3) a) 2.4 x102 m b) 69 m/s c) 1.4 x 102 m 4) a) 2.7 x 103 m b) 1.5 x104 m 5) 6.2 m 6) 8.4 m 7) a) 9.4 m/s b) 0.90 m 8) 1.23 m 9) 14 m/s 10) 10° 11) 0.26 m 12) 7.7 m/s, –> 13) a) 6.6 s b) 2.1 x 102 m 14) a) 0.82 s b) 0.82 m c) 5.7 m Related Posts Projectile problems are presented along with detailed solutions. At what angle should the nozzle point in order that the water land 2.0 m away? What was the ball's initial speed? It was caught by another student who was 10.0 m away. An arrow is shot at 30.0° angle with the horizontal. A camper dives from the edge of a swimming pool at water level with a speed of 8.0 m/s at an angle of 30.0° above the horizontal. 3. A hunter aims directly at a target (on the same level) 140 m away. a) How long did it remain in the air? A fire hose held near the ground shoots water at a speed of 7.5 m/s. Find the range and maximum altitude. Solution to Problem 7Problem 8The trajectory of a projectile launched from ground is given by the equation y = -0.025 x2 + 0.5 x, where x and y are the coordinate of the projectile on a rectangular system of axes.a) Find the initial velocity and the angle at which the projectile is launched. Why are there two different answers to this problem? Solution to Problem 2Problem 3A projectile is to be launched at an angle of 30° so that it falls beyond the pond of length 20 meters as shown in the figure.a) What is the range of values of the initial velocity so that the projectile falls between points M and N? Solution to Problem 5Problem 6A ball of 600 grams is kicked at an angle of 35° with the ground with an initial velocity V0.a) What is the initial velocity V0 of the ball if its kinetic energy is 22 Joules when its height is maximum?b) What is the maximum height reached by the ball Solution to Problem 6Problem 7A projectile starting from ground hits a target on the ground located at a distance of 1000 meters after 40 seconds.a) What is the size of the angle θ?b) At what initial velocity was the projectile launched? How far from the base of the cliff will the object strike the ground? A bullet traveling 800 m/s horizontally hits a target 180 m away. READ: Resonance in Physics: Overview & Summary13. a) What is the takeoff speed? b) How far did it travel horizontally? A ball is thrown horizontally from the roof of a building 50 m tall and lands 45 m from the base. Suppose the ball in #6 was missed, what would the range be? A student threw a ball horizontally out of a window 8.0 m above the ground. Solution to Problem 4Problem 5A ball kicked from ground level at an initial velocity of 60 m/s and an angle θ with ground reaches a horizontal distance of 200 meters.a) What is the size of angle θ?b) What is time of flight of the ball? If the bullet leaves the gun at a speed of 280 m/s, by how much will the bullet miss the target? An object is projected horizontally at 8.0 m/s from the top of a 122.5 m cliff. What was the initial velocity of the ball? A baseball was hit at 45 m/s at an angle of 45° above the horizontal. c) How far out in the pool does the diver land? How far does the bullet fall before it hits the target? b) If the takeoff speed was increased by 5.0%, how much longer would the jump be? Solution to Problem 9Projectile Motion Calculator and Solver Solution to Problem 3Problem 4A ball is kicked at an angle of 35° with the ground.a) What should be the initial velocity of the ball so that it hits a target that is 30 meters away at a height of 1.8 meters?b) What is the time for the ball to reach the target? An interactive html 5 applet may be used to better understand the projectile equations.Problems with Detailed SolutionsProblem 1An object is launched at a velocity of 20 m/s in a direction making an angle of 25° upward with the horizontal.a) What is the maximum height reached by the object?b) What is the total flight time (between launch and touching the ground) of the object?c) What is the horizontal range (maximum x above ground) of the object?d) What is the magnitude of the velocity of the object just before it hits the ground?Solution to Problem 1 Problem 2A projectile is launched from point O at an angle of 22° with an initial velocity of 15 m/s up an incline plane that makes an angle of 10° with the horizontal. b) What horizontal distance will the arrow travel? b) How high does the diver go? If the ball is caught at the same height it was tossed at, how far away is the teammate? a) How long is the diver in the air? Solution to Problem 8Problem 9Two balls A and B of masses 100 grams and 300 grams respectively are pushed horizontally from a table of height 3 meters. These problems may be better understood when projectile equations are first reviewed. An athlete executing a long jump leaves the ground at angle of 30.0° and travels 7.80 m. A basketball is held over head at a height of 2.4 m. The projectile hits the incline plane at point M.a) Find the time it takes for the projectile to hit the incline plane.b)Find the distance OM. A person kicks a rock off a cliff horizontally with a speed of 20 m/s.

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