

Physics 3204
Projectile Motion



Worksheet 4: Lands ABOVE and BELOW The Point Of Projection

Student Name: _____

PART A: MULTIPLE CHOICE

Instructions: Shade the letter of the correct answer on the computer scorable answer sheet provided

1. An arrow is fired at 45.5 m/s from a 5.75 m high tree branch, at an angle of 60° above the horizontal. What maximum height, above the ground, will the arrow reach?
 - (A) 32.1 m
 - (B) 73.4 m
 - (C) 79.1 m
 - (D) 84.9 m

2. Which is constant for all projectiles?
 - (A) horizontal displacement
 - (B) horizontal velocity
 - (C) vertical displacement
 - (D) vertical velocity

3. Which demonstrates projectile motion?
 - (A) ball rolling up a hill
 - (B) car driving down a street
 - (C) horse galloping around an oval track
 - (D) rock rolling off the edge of a cliff

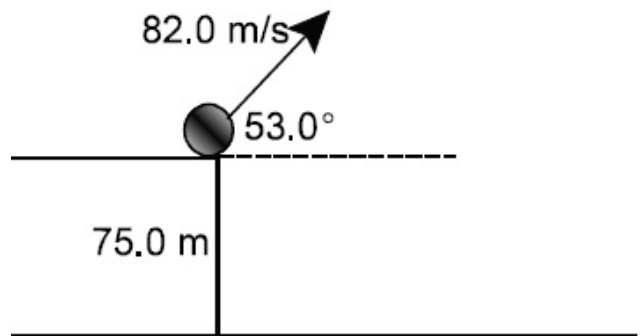
4. What is the direction of acceleration for any projectile?
 - (A) up
 - (B) down
 - (C) left
 - (D) right

5. A stone is thrown upward from the top of a building at an angle of 30.0° to the horizontal with an initial speed of 20.0 m/s. If the stone lands on the ground 4.22 s later, how tall is the building?
 - (A) 14.2 m
 - (B) 21.5 m
 - (C) 45.1 m
 - (D) 129 m

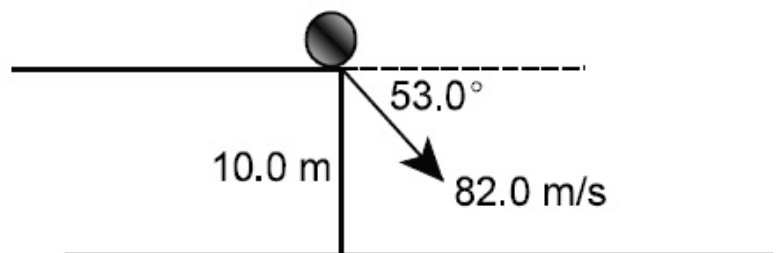
6. A projectile is launched at a 30.0° angle above the horizontal with a speed of 20.0 m/s. What is the vertical displacement after 3.0 s?
 - (A) - 74 m
 - (B) - 14 m
 - (C) + 12 m
 - (D) + 31 m

PART B: WRITTEN RESPONSE

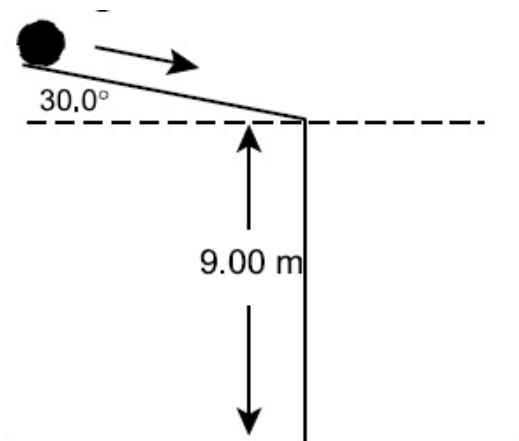
1. A ball is thrown from a 75.0 m high cliff, with an initial velocity of 82.0 m/s, at an angle of 53.0° above the horizontal. Calculate the range of the ball when it hits the ground below. **JUNE 2009**



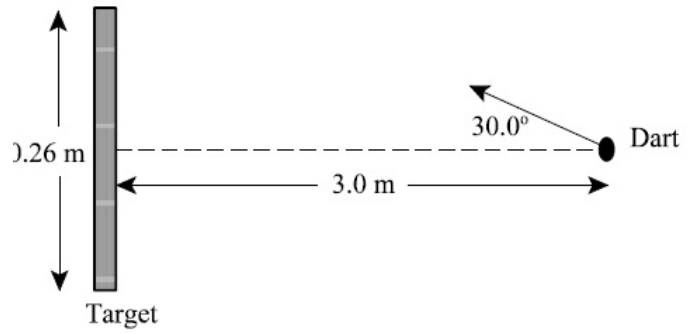
2. A ball is thrown with an initial velocity of 82.0 m/s at an angle of 53.0° below the horizontal as shown. Calculate the range of the ball if it is thrown from a height of 10.0 m. **AUGUST 2009**



3. A ball rolls off an incline at 20.0 m/s, as shown in the diagram below. At what horizontal distance from the wall will the ball hit the ground? **AUGUST 2006**



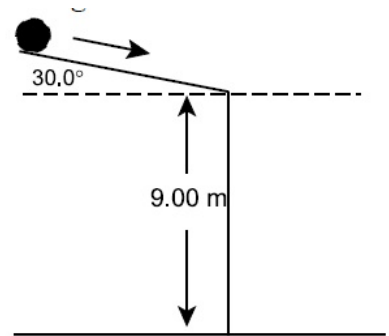
4. In the diagram below a dart that is in line with the midpoint of a 0.26 m high target, is thrown toward the target with a speed of 6.0 m/s at a 30.0° angle. Determine whether the dart will hit the target if it is 3.0 m away.



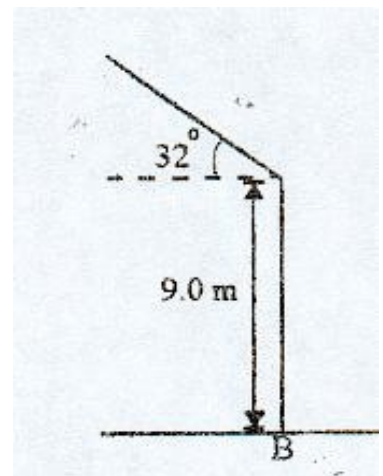
5. Ball A is rolled down a 30.0° ramp on a 1.0 m high table, and exits the table horizontally at 2.0 m/s. A second identical ball B, is rolled down the same ramp but exits the table with a speed of 2.0 m/s at a 30.0° angle. Calculate which ball will travel the greatest horizontal distance from the base of the table.



6. A ball rolls off an incline at 20.0 m/s , as shown in the diagram below. At what horizontal distance from the wall will the ball hit the ground?



7. A ball rolls off an incline, as shown, at a velocity of 22 m/s . How far from B will the ball hit the floor?



8. An object is projected from the top of a building at an angle of 28° , as shown in the diagram, at a velocity of 15 m/s . If the object hits the ground 32 m from the base of the building, how high is the building?

