

# Physics

Projectiles, Form: A

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Period: \_\_\_\_\_

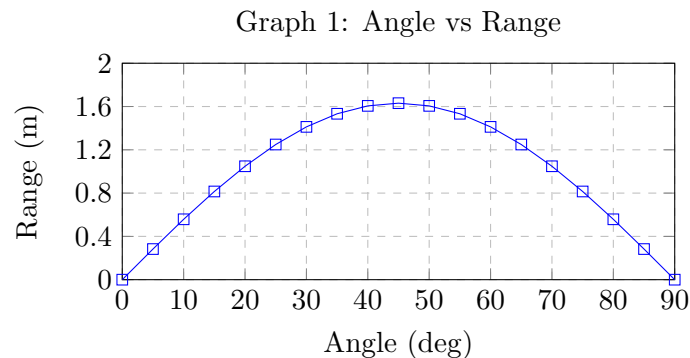
Primary Peer Reviewer: \_\_\_\_\_

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## Section 1. Multiple Choice

**The following information applies to questions 1-3:**

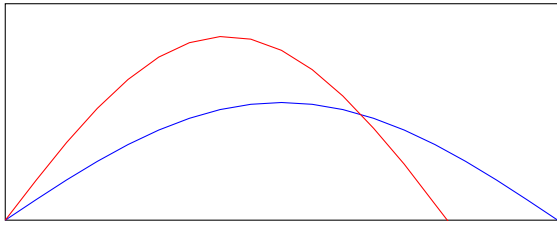
A projectile is launched multiple times. The angle of launch is increased from  $0^\circ$  to  $90^\circ$  in  $5^\circ$  increments. The following data is collected:



- At what angle is the range of the projectile greatest?
  - $0^\circ$
  - $45^\circ$
  - $90^\circ$
  - The range is the same for all angles.
- At what angle was the projectile in the air the longest?
  - $0^\circ$
  - $45^\circ$
  - $90^\circ$
  - The time in the air is the same for all angles.
- What two angles result in the same range?
  - $30^\circ$  and  $40^\circ$
  - $30^\circ$  and  $50^\circ$
  - $30^\circ$  and  $60^\circ$
  - $30^\circ$  and  $70^\circ$
- At the top of its path, a projectile's acceleration is -
  - $0 \text{ m/s}^2$
  - $9.81 \text{ m/s}^2$  downward
  - $9.81 \text{ m/s}^2$  horizontally
  - cannot be determined without more information.

5. Two projectiles are launched at the same speed, but different angles. Their trajectories are shown below:

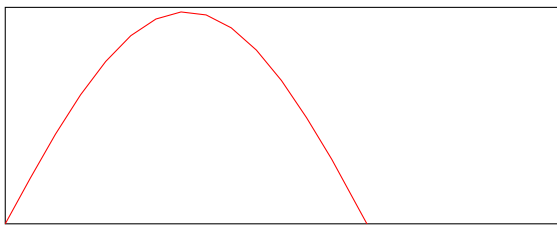
Figure 1: Two Projectiles



If projectile A was launched at a 45 degree angle to the ground, projectile B was launched at an angle -

- (a) greater than  $45^\circ$
  - (b) less than  $45^\circ$
  - (c) equal to  $45^\circ$
  - (d) there is no way to determine what angle projectile B was launched at.
6. A projectile's trajectory is shown below:

Figure 2: A Projectile's Path



At Point P, the horizontal velocity of the projectile is -

- (a) 0 m/s
  - (b) 9.81 m/s downward
  - (c) equal to the initial horizontal velocity.
  - (d) impossible to determine.
7. At Point P, the vertical velocity of the projectile is -
- (a) 0 m/s
  - (b) 9.81 m/s downward
  - (c) equal to the initial vertical velocity.
  - (d) impossible to determine.

## Section 2. Free Response

8. A projectile is fired from a cannon at a 30-degree angle with the ground and an initial velocity of 100 m/sec. Assuming no air resistance and  $g=9.81 \text{ m/s}^2$ ,

(a) calculate the time it will spend in the air.

(b) Calculate the maximum height of the cannonball.

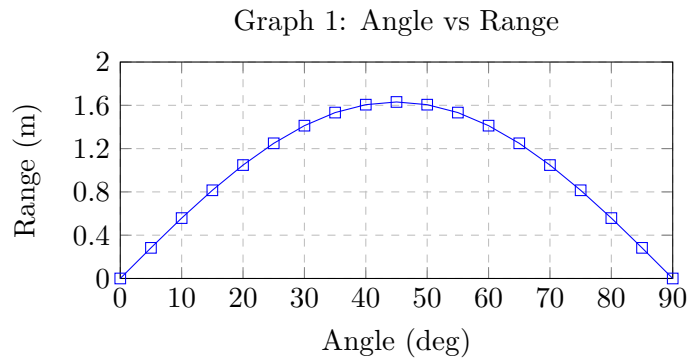
(c) What is the distance the cannonball lands from the cannon?

# Answer Key for Exam A

## Section 1. Multiple Choice

**The following information applies to questions 1-3:**

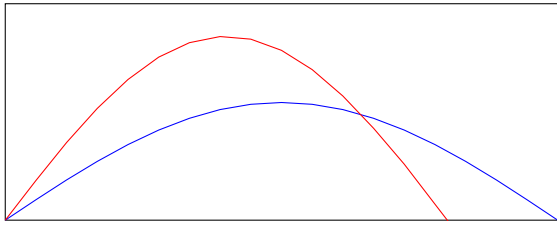
A projectile is launched multiple times. The angle of launch is increased from  $0^\circ$  to  $90^\circ$  in  $5^\circ$  increments. The following data is collected:



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  - (b)  $45^\circ$
  - (c)  $90^\circ$
  - (d) The range is the same for all angles.
2. At what angle was the projectile in the air the longest?
  - (a)  $0^\circ$
  - (b)  $45^\circ$
  - (c)  $90^\circ$
  - (d) The time in the air is the same for all angles.
3. What two angles result in the same range?
  - (a)  $30^\circ$  and  $40^\circ$
  - (b)  $30^\circ$  and  $50^\circ$
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4. At the top of its path, a projectile's acceleration is -
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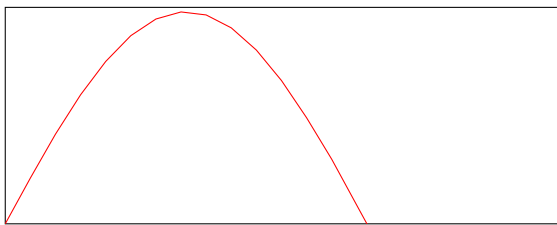
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(c) What is the distance the cannonball lands from the cannon?