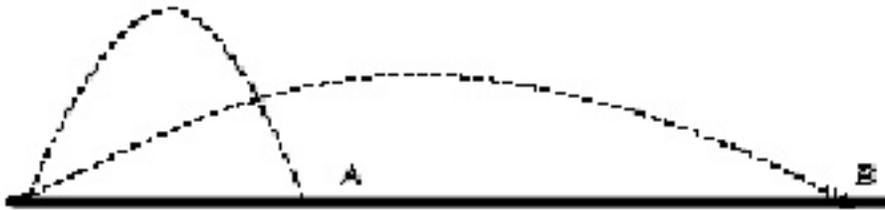


Problem 1

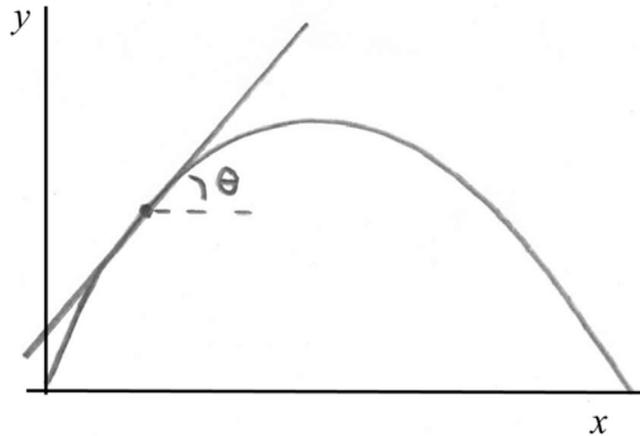
A person simultaneously throws two objects in the air. The objects leave the person's hands at different angles and travel along the parabolic trajectories indicated by A and B in the figure below. Which of the following statements best describes the motion of the two objects?



- a) The object moving along trajectory **A** hits the ground **before** the object moving along the trajectory **B**.
- b) The object moving along trajectory **A** hits the ground **after** the object moving along trajectory **B**.
- c) Both objects hit the ground at the same time.
- d) There is not enough information specified in order to determine which object hits the ground first.

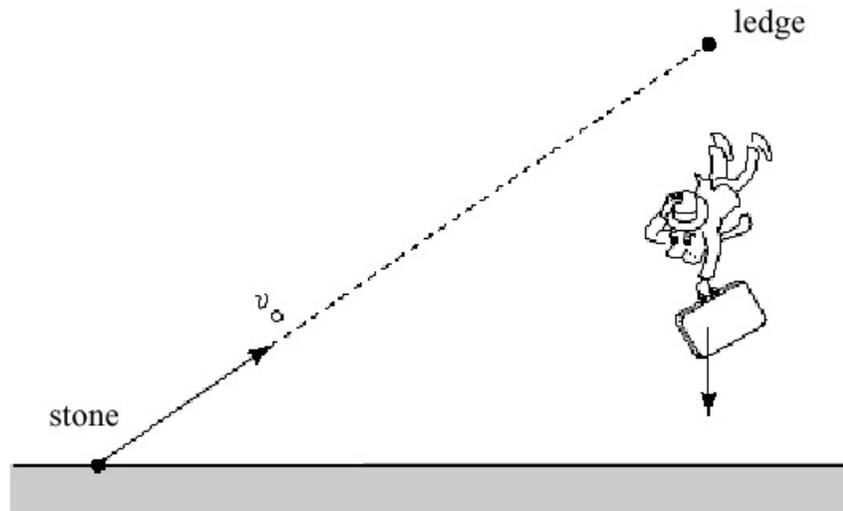
Problem 2

For a parabolic orbit under the influence of gravitation,



- 1) the magnitude of the **velocity** can be determined from the slope of the tangent line to the graph of y vs. x but **not the direction**
- 2) the magnitude and direction of the velocity **can** be determined from the slope of the tangent line to the graph of y vs. x
- 3) the magnitude and direction of the velocity **cannot** be determined from the slope of the tangent line to the graph of y vs. x
- 4) the direction of the **velocity** can be determined from the slope of the tangent line to the graph of y vs. x but **not the magnitude**.

Problem 3



Consider the situation depicted here. A stone is accurately aimed at a person hanging from the gutter of a building. The target is well within the stone's range, but the instant the stone is thrown, the person lets go and drops to the ground. The stone moves with a speed v_0 , just as it is released. What happens? The stone

- 1) hits the person, regardless of the value of v_0 ;
- 2) hits the person only if v_0 is large enough;
- 3) misses the person.

Problem 4

Consider a heavy projectile moving on an arc due to gravity. As it reaches the highest point in its arc, what can we say about the speed and acceleration of the object?

- 1) The speed and magnitude of the acceleration are zero.
- 2) The speed is at a minimum.
- 3) The magnitude of the acceleration is at a minimum.
- 4) Neither the magnitude of the acceleration nor the speed is minimized.