

# Arc Problem Quizlette

Name \_\_\_\_\_

**Red Elk shoots an air rocket at an angle of  $57.0^\circ$  above the horizontal at a speed of  $25.0 \text{ m/s}$  on a very level field.**

A) Break the velocity vector into components. (These become your initial velocities for x and y) Set up your horizontal/vertical table, fill it with known quantities, and solve for everything you don't know. (You know horizontally: both velocities and the acceleration, and vertically: the displacement, both velocities, and the acceleration) ( $13.616 \text{ m/s x} + 20.967 \text{ m/s y}$ )

B) What are the initial horizontal and vertical velocity components? ( $13.616 \text{ m/s x} + 20.967 \text{ m/s y}$ )	C) What time is the rocket in the air? ( $4.27 \text{ s}$ )	D) How far does the rocket go before hitting the ground? ( $58.2 \text{ m}$ )
E) What is the greatest height the rocket reaches? ( $22.4 \text{ m}$ )		F) What is the speed of the rocket at the highest point? ( $13.6 \text{ m/s}$ )

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What is the position (in VC notation, how far over, how far up) and velocity (AM notation - draw a picture) at  $1.50$  seconds? (20.4 m over and 20.4 m up, 15.0 m/s,  $24.7^\circ$  above horizontal)

Suppose the rocket hits a very tall wall that is  $45$  m away. How high up on the wall does it hit, and what is the velocity of impact in AM notation? (draw a picture) (15.7 m up the wall,  $17.8$  m/s  $40.1^\circ$  below the horizontal)