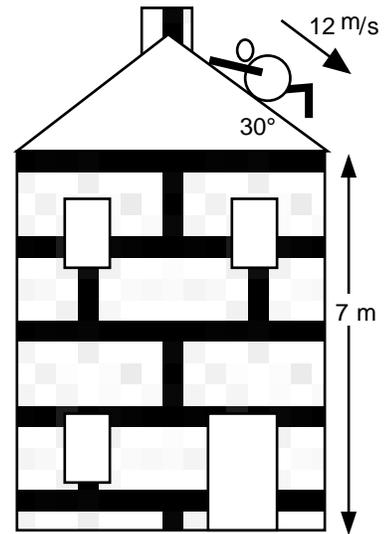


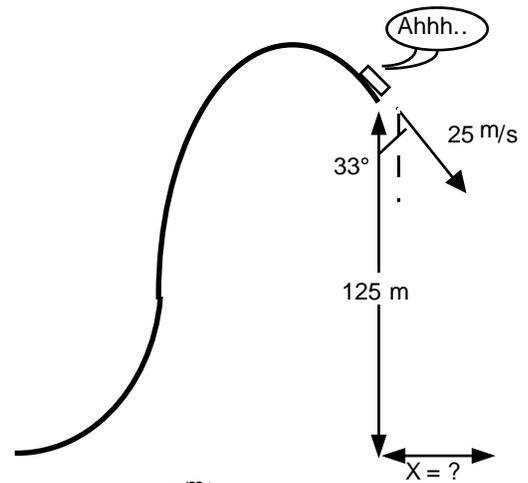
## Projectile Motion

### 8 REVIEW QUESTIONS COVERING THE DIFFERENT SETUPS

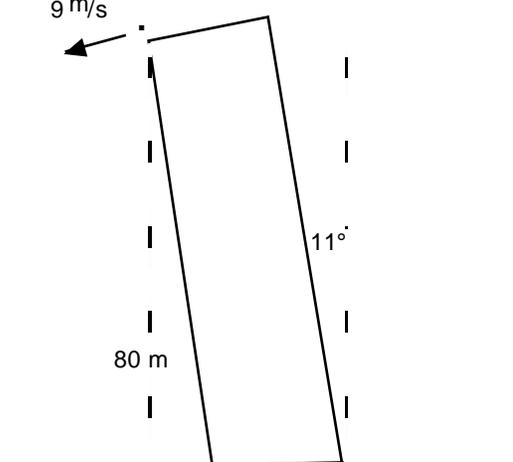
- While delivering toys Santa Claus slips off the top of a roof. At the edge of the roof he is traveling  $12 \text{ m/s}$ .
  - How long is Santa in the air?
  - How far from the edge of the house will he land?
  - With what speed and direction will Santa impact the ground?



- A roller coaster car travels off a hill while traveling downward.
  - How long is the roller coaster car in the air?
  - How far from the edge of the broken track will the roller coaster car?
  - With what speed and direction will roller coaster car impact the ground?



- A grape rolls off the top of the leaning tower of Pisa at  $9 \text{ m/s}$ . The tower is  $80 \text{ m}$  high and tilts at an  $11^\circ$  angle with the vertical.
  - How long is the grape in the air?
  - How far from the edge will the grape land?
  - With what speed and direction will the grape impact the ground?

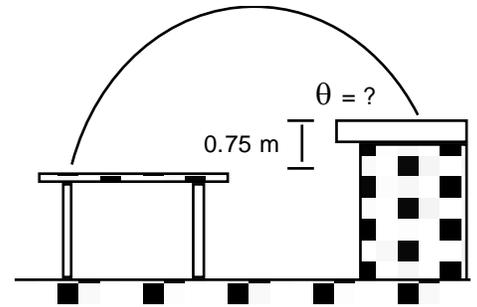


- A dog is in a field catching a frisbee. The dog leaves the ground at  $7.53 \text{ m/s}$  at an angle of  $50^\circ$  with the ground to catch a frisbee at his apogee.
  - How long was the dog in the air until it caught the frisbee?
  - How far, horizontally, did the dog jump to the location where he caught the frisbee?
  - How high did the dog jump?

## Projectile Motion

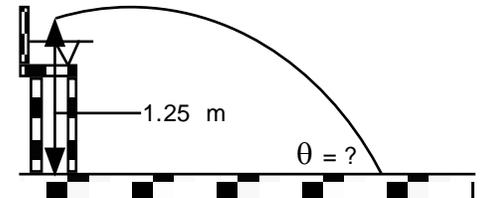
5. Calvin was flicking pennies at Hobbes. One of his pennies flew upwards at  $5.0 \text{ m/s}$  at an  $75^\circ$  angle with the table top. When it landed, it was  $0.75$  meters higher than it started.

- How long was the penny in the air?
- How far, horizontally, did the penny travel?
- How high did the penny travel?
- With what speed and angle will the penny impact the counter top across the room?

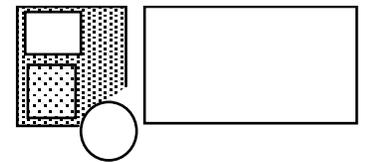
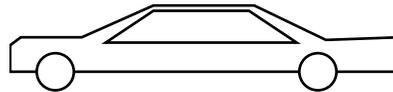


6. Little baby Herman threw a green bean upwards with a velocity of  $3 \text{ m/s}$  at a  $30^\circ$  angle. The bean landed  $1.25$  meters below where it was thrown.

- How long was the bean in the air?
- How far, horizontally, did the bean travel?
- How high did the bean travel?
- With what speed and angle will the bean impact the ground?



7. A bug,  $0.06 \text{ kg}$ , bounces upwards off a windshield while traveling  $55 \text{ mph}$ ,  $26.5 \text{ m/s}$ . The bug bounces at a  $37^\circ$  angle with the horizontal. The bug hit the windshield of a truck behind the car at a height of  $0.82 \text{ m}$  above the bounce.



- How long was the bug in the air?
- How far, horizontally, did the bug travel?
- How high did the bug travel?
- With what speed and angle will the bug impact the windshield?

8. While chasing the "Road Runner," Wile E. Coyote makes wrong turn and ends up sliding horizontally off the edge of a high cliff. He leaves the edge of the cliff while traveling  $55 \text{ m/s}$ . The cliff's edge is  $1505 \text{ m}$  above a canyon floor.
- For how much time was the coyote in the air?
  - Horizontally, how far did the coyote travel before impacting the canyon floor?
  - With what speed and angle did the coyote impact the canyon floor?

\*

1.  $0.73 \text{ s}$ ,  $7.6 \text{ m}$ ,  $16.8 \text{ m/s}$  @  $51.8^\circ$ ; 2.  $3.34 \text{ s}$ ,  $45.5 \text{ m}$ ,  $55.5 \text{ m/s}$  @  $75.8^\circ$ ;  
 3.  $3.87 \text{ s}$ ,  $34.1 \text{ m}$ ,  $40.6 \text{ m/s}$  @  $77.5^\circ$ ;  $0.589 \text{ s}$ ,  $2.85 \text{ m}$ ,  $1.7 \text{ m}$ ; 5.  $0.793 \text{ s}$ ,  
 $1.02 \text{ m}$ ,  $1.19 \text{ m}$  above table,  $3.21 \text{ m/s}$  @  $-66.3^\circ$ ; 6.  $0.684 \text{ s}$ ,  $1.78 \text{ m}$ ,  $.115 \text{ m}$   
 above starting pt,  $5.81 \text{ m/s}$  @  $-63.4^\circ$ ; 7.  $3.19 \text{ s}$ ,  $67.7 \text{ m}$ ,  $12.9 \text{ m}$ ,  $26.2 \text{ m/s}$  @  
 $36^\circ$ ; 8.  $17.5 \text{ s}$ ,  $964 \text{ m}$ ,  $180 \text{ m/s}$  @  $72.3^\circ$