

# the snowball fight in nebraska

Growing up in Nebraska, my brother and I had many snowball fights. My brother Jim liked to mess with me in general. He would always seem to hit me with a snowball until I realized his strategy. He lofted a snow ball at  $\sim 70^\circ$  at me. I was caught looking up when all of a sudden I felt a cold smack in the face. What the heck! Getting angry didn't solve my problem. Though, it did feel good to hit him a few times with a hard-packed snowball. What was Jim's strategy? Show it in a diagram. Assume Jim throws the snowball with  $v = 25 \text{ m/s}$  at a  $70^\circ$  angle wrt to the ground. How long is it in the air? How far will the snowball travel? At what other angle will another snowball thrown with the same initial velocity hit its target?

## Diagram



Motion Equations

What else do we know? Show some equations and state some reasoning.

Time in the Air (y-direction)

Range of the Snowball (x-direction)

What is the other angle at which Jim can throw the snowball and hit the target (me)? How long is the second snowball in the air?

So, does the strategy work? Why?

Physics \_\_\_\_\_  
Period \_\_\_\_\_

Name \_\_\_\_\_  
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