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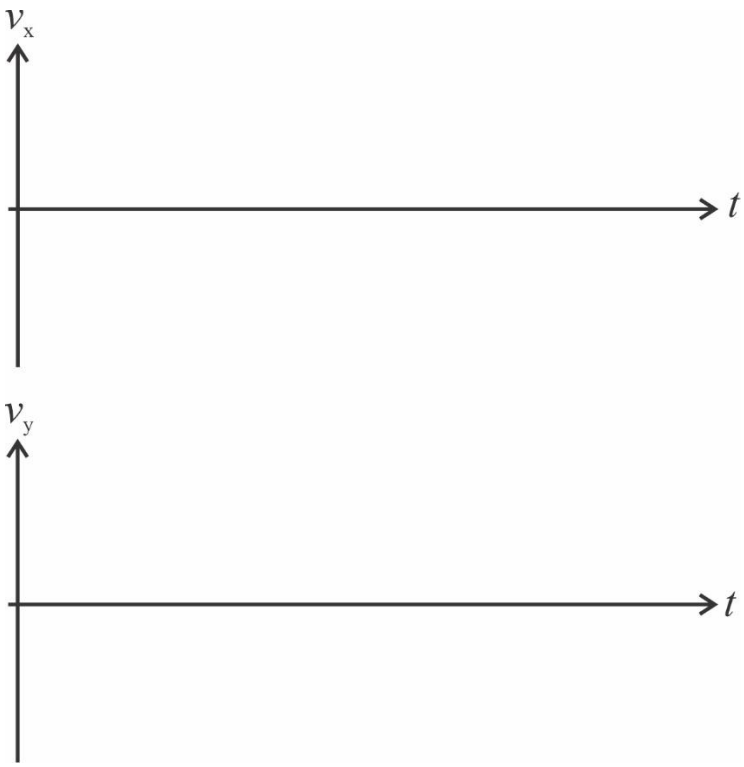
0. FINN'S JUMP

The video https://youtu.be/_sCp1igJ3j8 shows Finn running along the pier and then jumping into the sea.

KINEMATICS

a. Draw motion diagram for horizontal velocity and vertical velocity

b. Using the diagram depicted draw a qualitative $v_x(t)$ and $v_y(t)$ graphs for Finn's motion, treating him as a point-like object that is positioned at the spot marked on the photo (let's call this point *center of mass*). Indicate any assumptions that you made.



c. Compare your graphs with the actual graphs https://drive.google.com/file/d/15SZnh2IwHAfodD4CGqAQse3P3JIVBhoh/view?usp=sharing that were obtained by tracking the Finn's motion from the video. Do they match? If not, suggest what might be the reasons for the differences (think of the assumptions that you made) and if necessary, revise your graphs.

d. Using data from the actual velocity-versus-time graphs compare the average magnitudes of Finn's acceleration while he is running along the pier and while he is falling. Which one is larger? How do you know? Are the values reasonable? How do you know?

e. Using data from the actual velocity-versus-time graphs and knowing that the distance between Finn's center of mass and the water level is 2.2 m, determine how far from the pier Finn jumped into the water. Indicate any assumptions that you made.

Then watch the video again and compare the calculated value with the actual value. Do the values match? If not, suggest what might be the reasons for the differences (think of the assumptions that you made).