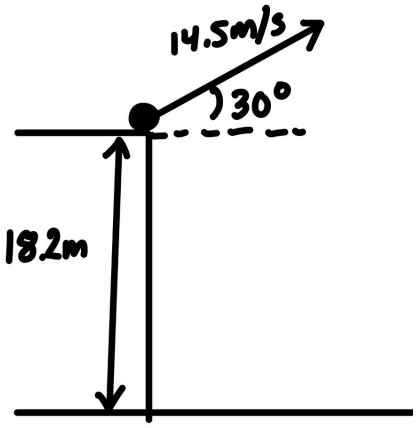
Projectile Motion (Launched at an angle)

1. A soccer ball is kicked and leaves the ground at 30m/s at 60° above the horizontal.
   a) What are the initial vertical and horizontal components of the velocity?
   b) Which component (horizontal or vertical) is constant? Why?
   c) How long will the ball travel in the air for?
   d) How far will the ball go?
   e) What is the max height reached by the ball?
   f) After 1s of flight time, what is the velocity (magnitude and direction) of the ball?

2. A golf ball is struck on the ground at 70m/s at 25° above the horizontal. How far does it go?

3. A ball is launched from a cliff 18.2m high off the ground at 14.5m/s 30° to the horizontal.

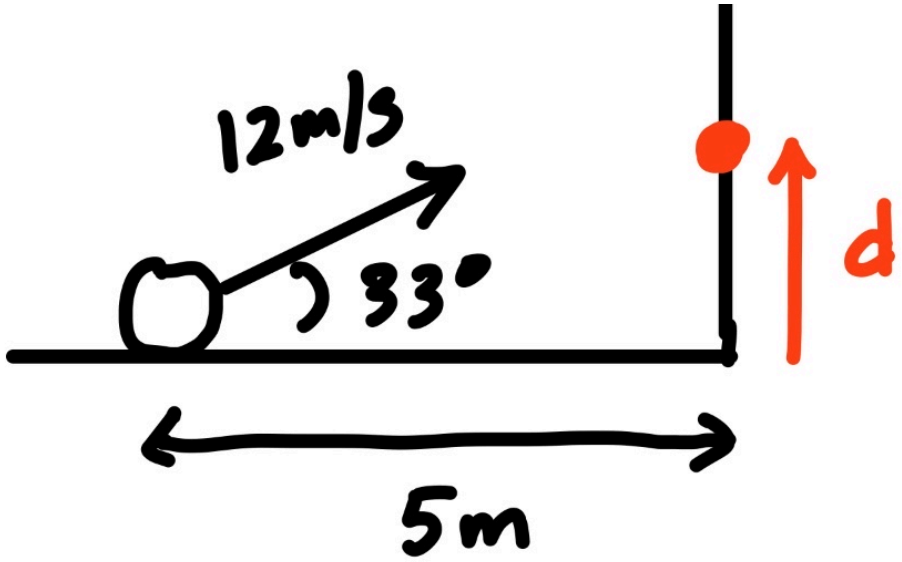


   a) Find the initial vertical and horizontal velocities.
   b) How far from the cliff does the ball go?
   c) How high above the ground does the ball go (max)?
   d) Find the velocity just before it hits the ground.

4. A ball is launched from a building at 25m/s 44° above the horizontal. If the ball lands 200m away from the building, how tall is the building?

5. A ball is launched from a building at 25m/s 44° **below** the horizontal. If the ball lands 200m away from the building, how tall is the building?

6. A soccer ball is kicked towards a wall 5m away. If the ball is hit with a speed of 12m/s at 33° above the horizontal, how high on the wall does the ball hit?



7. A basketball player throws a basketball 2m above the ground at 10m/s 80° above the horizontal. The net is 4m tall.

a) Determine the vertical component of the velocity when it is at the level of the net.
b) Why do you get two answers? Draw on the path where these two velocities occur.