

Vertical Motion: Acceleration due to gravity

A ball is thrown vertically upward from the ground with an initial velocity of 30 m/s. The ball will rise to its highest point and return to the ground.

Let the ground be $y = 0$ and upward be the positive direction. Assume $g = 10 \text{ m/sec}^2$.

a) Draw a motion diagram for the motion.

b) Determine the position, velocity, and acceleration for the time indicated. Give the appropriate sign (+/-) for each value. Continue for time values until the ball returns to the ground.

<u>time (sec)</u>	<u>position (m)</u>	<u>velocity (m/s)</u>	<u>acceleration (m/s²)</u>
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$t = 0$

$t = 1$

$t = 2$

$t = 3$

$t = 4$

$t = 5$

$t = 6$

c) Write equations for position and velocity vs. time.

$y(t) =$

$v(t) =$

d) Make sketches of these graphs on graph paper.



