

Math 3280 Worksheet 3: 1st order linear ODEs

Group members (2 to 4): _____

- (1) A basketball is dropped from a height of 3 meters, with zero initial velocity. After it hits the ground (at height zero), its velocity is reversed and is decreased to 80% of its magnitude.

We will model the ball's motion by ignoring air resistance and assuming a constant gravitational acceleration of -9.8 meters/second².

- (a) First find the velocity and height as functions of time, both before the ball hits the ground and afterwards.

- (b) Find the maximum height that the ball attains after it first hits the ground.

(2) Compute $y(1)$ after solving the initial value problem $\frac{dy}{dx} = y + x$, $y(0) = 1$.