# CE 3305 Fluid Mechanics
## Spring 2014 Quiz 9

1. Figure 1 is a photograph of the fountains at the Bellagio Hotel and Las Vegas Nevada. A water jet issues vertically from the fountain (multiple jets appear in the photograph) at a speed of 60 feet per second. How high will the jet rise? [1]

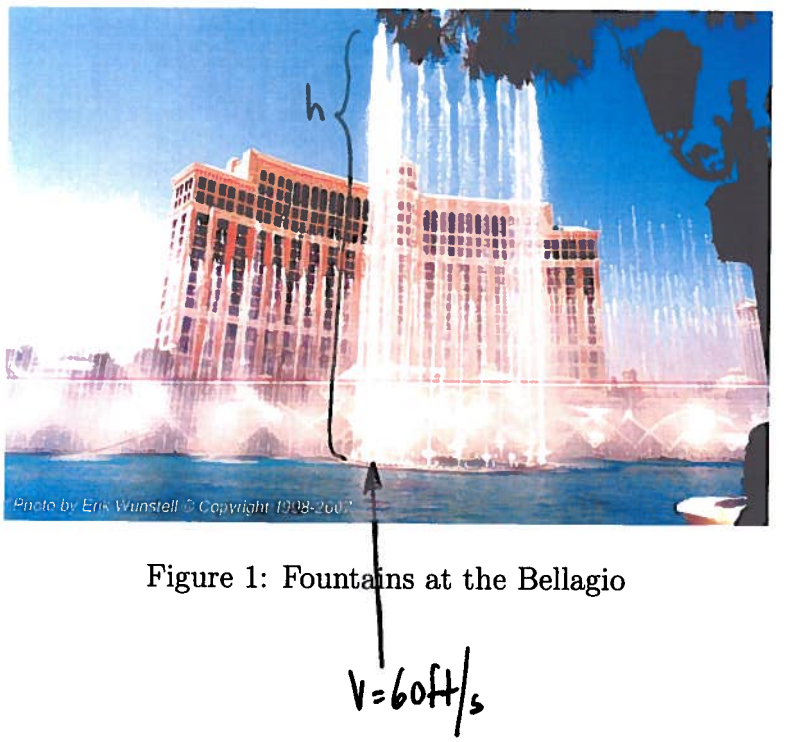
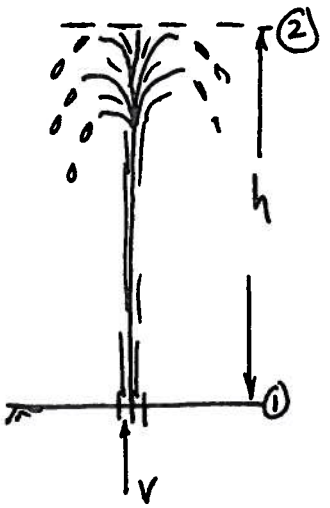



Figure 1: Fountains at the Bellagio

[1] Use Bernoulli's equation along the jet centerline, a usual assumption is that pressure in the jet is atmospheric – all energy is velocity and/or elevation.




KNOWN

$V_{(1)} = 60 ft/s$ $\quad p_1 = p_2 = 0$ gage.

$\gamma = \rho g = 62.4 lbf/ft^3$ $\quad z_1 = 0$

$g = 32.2 ft/s^2$ $\quad z_2 = h?$

EQUATION(S)

$\frac{p}{\gamma} + z + \frac{V^2}{2g} = \text{CONSTANT}$ (BERNOULLI'S)

FIND

$h?$

SOLUTION

$\frac{p_1}{\gamma}$ (0 gage) $+ z_1 + \frac{V_1^2}{2g} = \frac{p_2}{\gamma}$ (0 gage) $+ z_2 + \frac{V_2^2}{2g}$ (0 top of jet, just as water "falls" over.)

$z_1 = 0$ DATUM

$$\frac{V_1^2}{2g} = z_2 = h$$

$$h = \frac{(60 ft/s)^2}{2(32.2 ft/s^2)} = 55.9 ft \longleftarrow h$$