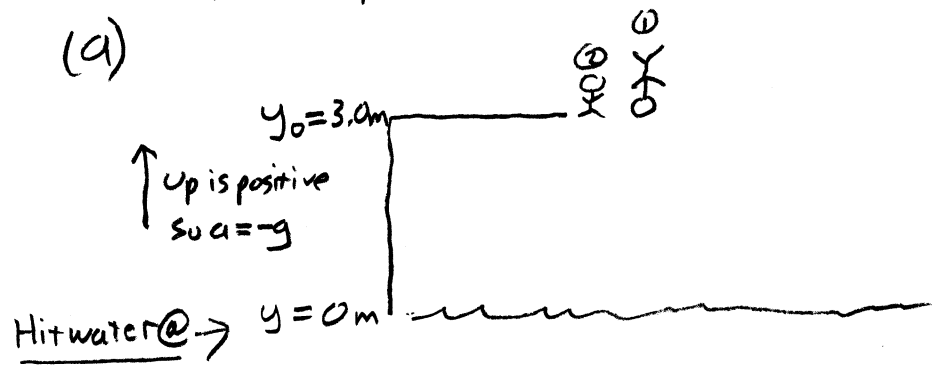
2-70

Before diving in to the problem (ha ha), stop and think. Since only concerned with when & how fast they hit the water, set $t=0$ when second diver steps off platform. As usual, define up as positive.

(a)



First Diver

$V_0 = -1.80 \frac{m}{s}$ (Think about this) $(v_f^2 = v_0^2 + 2a(y - y_0))$ $\Delta y = 0$

So $V_1^2 = V_0^2 - 2g(y - y_0)$

$V_1^2 = (-1.80 \frac{m}{s})^2 - 2 \cdot (9.81 \frac{m}{s^2})(0m - 3m)$

$V_1 = -7.88 \frac{m}{s}$

Second Diver

$V_0 = 0 \frac{m}{s}$

$V_2^2 = -2g(y - y_0)$

$V_2^2 = -2 \cdot (9.81 \frac{m}{s^2})(0m - 3m)$

$V_2 = -7.67 \frac{m}{s}$

(b) Since constant acceleration, use (Eq 2-9) $y = y_0 + \frac{1}{2}(V_0 + V)t$

Solve for t: $t = \frac{2(y - y_0)}{(v_0 + V)}$

First Diver

$t_1 = \frac{2(0m - 3m)}{-1.80 \frac{m}{s} - 7.88 \frac{m}{s}}$

$t_1 = .620s$

Second Diver

$t_2 = \frac{2(0m - 3m)}{0 - 7.67 \frac{m}{s}}$

$t_2 = .782s$

$t_2 - t_1 = .162s = \underline{162ms}$

First diver hits water ~162ms before second diver.

Ask yourself if your answer makes sense.

Mine does.