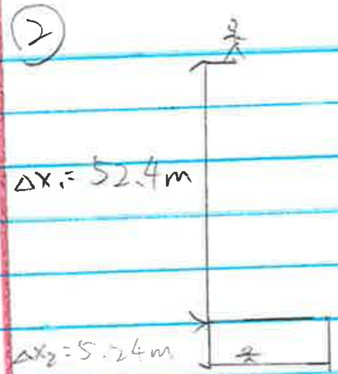
10

(2)



The distance he plunged below the surface

$\frac{1}{10} \times 52.4m = 5.24m$

$V_0 = 0$

FBD

When he is diving in the air, the only force is $F_g = 190\ lbs \cdot \frac{1N}{0.225\ lb} = 844.4\ N$

$F_g = mg = m \cdot 9.8\ N/kg = 844.4N$

his mass $= m = \frac{844.4N}{9.8\ N/kg} = 86.16\ kg$

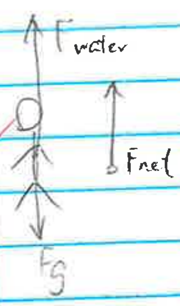
$F_{net} = F_g = ma_g = 844.4N = 86.16kg \times 9.8\ m/s^2$

his velocity when he gets into the water is V_f

$V_f^2 = V_0^2 + 2a_g \Delta X_1 = 0 + 2 \times 9.8\ m/s^2 \times 52.4m$

$V_f = 32.05\ m/s$

FBD



When he dives into the water, his velocity decreases to zero. Because the net force is going ~~upward~~ and the acceleration (a_2) is going upward.

$V_{f'}^2 = V_f^2 + 2a_2 \Delta X_2 = (32.05m/s)^2 + 2a_2 \times (5.24m)$

$0 = (32.05m/s)^2 + 2a_2 \times 5.24m$

$a_2 = 98.02\ m/s^2$

$F_{net} = F_{water} - F_g = ma_2 = 98.02m/s^2 \times 86.16kg$

$= 8445.4\ N$

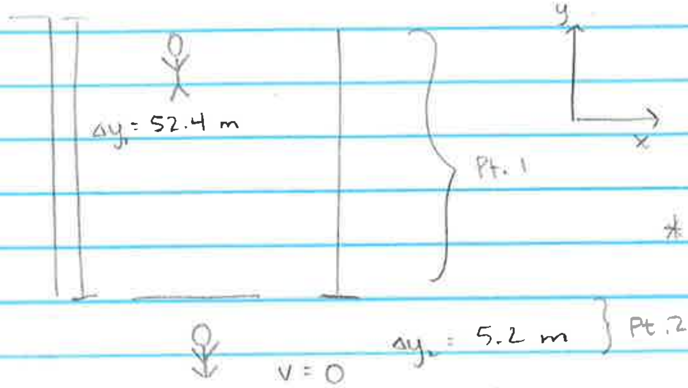
Therefore: The average force water exerted on his is

$F_{water} = F_{net} + F_g = 8445.4N + 844.4N$

$= 9289.8\ N$

vg

2



$m = 190$ lbs
≈ 80 kg

* need to find a_2 + time it took to reach H_2O

Part 1

$y = v_{oy}\Delta t + \frac{1}{2}(a_y)(t)^2$

$-52.4_m = 0(\Delta t) + \frac{1}{2}(-9.8\ m/s^2)(t)^2$

$-52.4\ m/s = \frac{1}{2}(-9.8\ m/s^2)(t)^2$ lousy units!

$t^2 = 10.7\ s$

$t = 3.2\ s$ ← to reach H_2O

A running narrative justifying your choices will help avoid errors like this

$v_{yf} = v_{y1} + a_x \Delta t$

$v_{yf} = 0 + (-9.8\ m/s)(3.2\ s)$

$= -31.36\ m/s$

Pt. 2

$\Delta t = \frac{\Delta x}{v}$ ← but that's $v_{av} \neq v_{yi}$

v_{yf} now becomes v_{yi}

$t = \frac{5.2\ m}{-31.36\ m/s}$

$= 0.17\ s$ ← to travel 1/10 of 52.4 m underwater

$v_{yf} = v_{yi} + a_x \Delta t$

$0 = -31.36\ m/s + a_x(0.17\ s)$

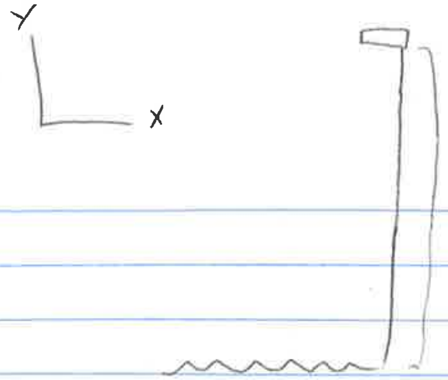
$31.36\ m/s = a_x(0.17\ s)$

$a_x = 184.5\ m/s^2$ not feasible ?

$F = ma_x = F_{net} = F_{water} - F_g$

$= 80\ kg(184.5\ m/s^2)$

$= 14757.6\ N$ $\neq F_{water}$



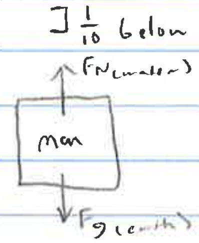
5

(2)

$m = 190$ pounds ≈ 95
$\times\ 0.45$
$= 85.5\ Kg$ ✓

· Multiplyed 190 pounds by 0.45 bc 1 lb = .45 kg

$F_a = ?$



implies $a = 0$

$F_{net_y} = F_N - F_g = 0$, $F_N = F_g$

$\vec{F}_{net_y} = m\vec{a}$

~~acceleration is negative~~

$F_g = mg$

$F_g = (85.5\ Kg)(9.8\ \frac{N}{Kg})$

$F_g \approx 850N = 837.9N$

~~52.4 m → 5.24~~

~~10 → 5.24 below surface~~

Since,

$F_N = F_g$

Overall he traveled $= 52.4m + 5.24m = 57.64m$

unused

$F_N = 837.9N.$ ~~$F_{net_y} = m\vec{a}$~~

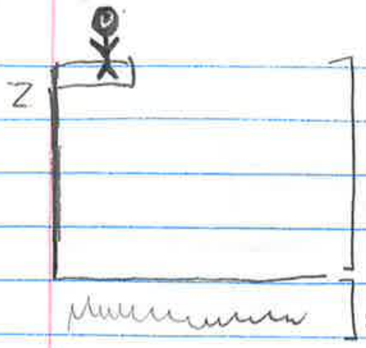
~~$(85.5 Kg)(\vec{a})$~~

~~$F_g = (85.5 Kg)($~~

· To begin you have to provide a picture and all variables provided to prepare for finding the force. ~~We know the man goes 1/10 of the way underwater as height above the surface so we calculate that by dividing the height by 10 and getting~~. To begin you have to transfer the mans weight into (Kg) for pounds. Since I know that 0.45 Kg = 1 pound I multiplyed his weight by that variable to recieve his ~~weight~~ mass in (Kg). Then on my F.B.D. my forces ended up equaling ✗ each other which allowed me to say that the Net force of the vertical components were = to each other ($F_N = F_g$). So I then plugged the mass of the man and the gravity expon on him to calculate the force of gravity which was ✗ equal to the normal force of the water. Also I assumed their was a constant velocity, therefore no acceleration in this problem.

If $F_N = F_g$, $a = 0$ & he doesn't slow.

3



Accelerates towards the pool at 9.8 m/s²

~~w~~ 86.2 Kg. His mass is roughly 86.2 kg. ✓

~~His [illegible] is [illegible] N~~

~~[illegible]~~ $F_{net} = m \times \vec{a}$ 86.2 × $\vec{0}$ = 0 (no longer acceleration in water)

$F_{net} = m \times \vec{a} = 86.2 \times 9.8 = 844.76$ N as he hits the water.

bad calc

844.76/10 / 2 ✗

The High diver's mass is roughly 86.2 Kg. His net force when he hit the water would be 844.76 N. ✗ ~~Assuming that he plunges to 1/10 of his initial height~~ Since he hit the water feet first, the surface of the water would give allowing him to plunge 1/10 of his original height or 5.24 meters into the water. The force exerted on him by the water ~~would change~~ as he plunges further into the water. Since he would no longer be accelerating when he got to 5.24 meters in the water the average force exerted on him by the water would be around 422.35 N.

not if he immediately rises again
$V = 0$ doesn't imply $a = 0$

Doesn't answer question