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Project 2 Response

You gave some numbers to 6 decimal places... really? How accurately have you measured these values?

Our displacement values were given to five, three and four decimal places respectively. Throughout our calculations, we kept our values between two and three decimal places. Why we kept greater decimal values, I'm not sure - there is no need to. Our calculations aren't perfect, and therefore don't need values as *exact** as the ones that we've provided.

*calculated on values as close as we could measure to – not perfect nor exact.

You have force of gravity, and the normal force? Which one changes and which one stays the same. It seems you've mixed up the two forces when you substitute into your equation at ~ 1 minute.

You are right, we wrote our equation wrong. Force of gravity stays the same while the normal force changes as the elevator accelerates/decelerates. The equation should have been written as

$$F_N - F_g = m_K \cdot \vec{a}$$

This equation will give us the values as found in our video.

How did you get your expected value? Can you discuss this?

As written on the board, we counted 28 steps per floor. Each step is 16.5 cm tall. Our experiment was conducted using 3 floors. Below is how we calculated our expected distance:

$$\left.\begin{matrix} 28\frac{steps}{floor} \\ 16.5\frac{cm}{step} \end{matrix}\right\} 462\frac{cm}{Floor} \longrightarrow \frac{4.62m}{Floor} \cdot 3\ Floors = 13.86m = Expected\ Distance$$

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Is your result consistent with your expected uncertainty (or are your values really accurate to 6 decimal places?)?

Our ending result is within a reasonable percentage of error. We obviously can't measure everything to 5 decimal places, we weren't *that* precise, so being just under a meter difference is pretty good.

Lastly, you accelerated longer in slowing down than in speeding up, but the change in velocity must be the same for both (in opposite directions). Thus, the acceleration in the beginning must be greater than in the end (which you find). Thus, there should not be a 10 lb difference for both. The change in reading on the scale should be greater in the beginning than in the end. You can actually see this. The equilibrium weight is closer to 131. Then it goes down below 120 and up to 140, so the change is greater in downward acceleration than upward acceleration.

You are correct. Looking back at the footage, it can be seen that my weight goes under 120 and to about 140, which means our calculations, which relied on a 10 lbs difference, are a bit off. Therefore, the acceleration must be greater in the beginning since it's over a short amount of time and the acceleration at the end should be less than what we calculated since it accelerates for a longer time period. This must be true since the accelerations must cancel each other out to get the final velocity to 0 m/s.