

A student measures distance x to be 5 meters and area A to be 25 ft^2 . Discuss with neighbors which of the following are true; then vote for all that are true.



1. $[x^2] = [A]$
2. $[5x] = A$
3. $x^2 = [A]$
4. $x^2 = A$
5. None of the above

As part of an exam a few years ago, a student wrote the following derivation of a final result. Without knowing the problem, but knowing the dimensions of each quantity shown along the bottom can you determine:



Is equation D correct?

1. Yes
2. No
3. Can't tell

$$A. \quad Mgh = \frac{1}{2}Mv^2 + \frac{1}{2}I\omega^2$$

$$B. \quad Mgh = \frac{1}{2}Mv^2 + \frac{1}{2}(MR^2)\omega^2$$

$$C. \quad Mgh = \frac{1}{2}Mv^2 + \frac{1}{2}(MR^2)\left(\frac{v^2}{R}\right)^2$$

$$D. \quad gh = \frac{1}{2}v^2 + \frac{1}{2}v^4$$

Given that equation D is NOT correct, can you tell which is the first line that has an error?

$$[M]=M \quad [g]=L/T^2 \quad [h]=L \quad [\omega]=/T \quad [v]=L/T \quad [R]=L \quad [I]=ML^2$$



- The diffusion constant D , describes how molecules jiggling around in a fluid drift. It has dimensions

$$[D] = L^2/T$$

- We have good reason to believe (we'll see it in a reading later) that D depends on the average distance a molecules travels, λ , and it's average speed v .
- If $[\lambda] = L$ and $[v] = L/T$ guess an equation that expresses D in terms of λ and v .