Forces Review

Ian Lee, Jackson Weirick
Maddy Reilly, Haley Choi

Terms/Vocabulary

- Dynamics: Describes why things move
- Force: Push or pull of an object; an action capable of accelerating an object
- Inertia: Body's resistance to a change in motion
- Tension: A flexible cord pulling on an object (always acts parallel to the cord)
- Equilibrium: A system in equilibrium if the net force on it is zero.
- Terminal Velocity: $F_{drag}=Fg$

Continued...

- Mass: a term used to measure the amount of inertia
- Weight: The amount of force gravity has
- Normal force: force acting perpendicular to a common surface of an object
- Friction: a contact force
- Free Body Diagram: A diagram showing all forces acting on the object involved

Concepts

- Force is a vector
  - Has a magnitude and a direction
- Newton’s 1st Law
  - Object will stay at rest unless a force acts upon it
- Newton’s 2nd Law
  - a = ∑F/m -> ∑F=ma
  - Acceleration of an object is proportional and correlative to the net force acting on an object.
- Newton’s 3rd Law
  - For every action, there is an equal and opposite force reacting on it
- Free Body Diagrams
  - A visual display of all the forces acting on an object

Equations

- $F=ma$
- $F_{net} = \sqrt{F_1+F_2+...+F_N}$
- $F_f=\mu F_n$
- $F_n=mg$
- $F_g=mg$
- $Ff,s \leq \mu sFN$
- $\mu s > \mu k$
- $F|| = Fg \sin\theta$
- $F\square = Fg \cos\theta$

Common Misconceptions

- Newton's 1st Law
  - It is not always true as it depends on the subject's frame of reference
    - For example when accelerating from rest in a car, and a cup of water was to spill on you, the cup had no force spilling it on you.
      - That is where inertia, or an object's resistance to motion comes into play
- Aristotle's theory
  - He believed an object constantly needed a force upon it to keep it moving.
    - And the greater the force the more velocity it will have
      - This is not completely true as an object can have an equal and opposite force opposing it, keep it at the same speed
- An object is hard to push because it is heavy
  - A heavy object is harder to push not because of it's weight but because of its inertia or mass

FRQ - How to **think** about the question

1. Know what the question is asking for
    a. Underline or circle words that are important to solve
2. Identify which equation is efficient
    a. Write it out
3. List given informations along with its units
    a. (if the problem can be displayed visually, then take that advantage-visual displays help you a lot!)
4. Carefully solve
5. Check to make sure that your answer makes sense
6. DON'T FORGET about units

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B. Your inertia keeps you moving forward

C. Someone pushed you

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A. creates a friction with the hammer.

B. disappears into the wood.

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B. Seconds

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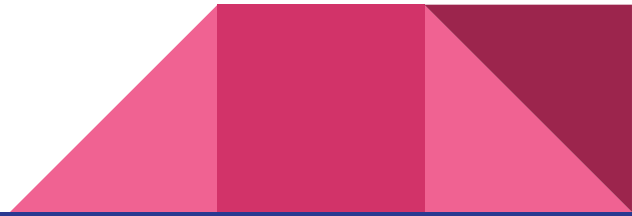

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B. 100 N

C. 180 N

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If you apply a net force of 3 N on a 100 g box, what is the acceleration of the box?

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