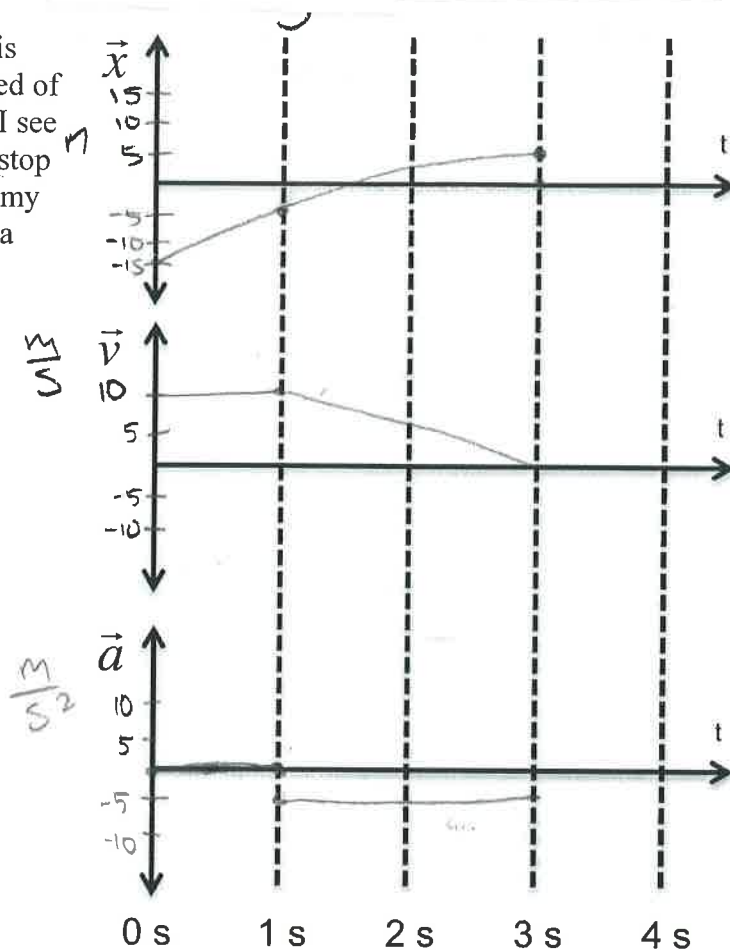


1) My mass is 70 kg, and the mass of my bike is 10 kg. I'm riding my bike at a constant speed of 10 m/s. After 1s, my displacement is -5 m, I see a car, apply a constant force, and slow to a stop over a period of two seconds. Please graph my acceleration, velocity, and displacement as a function of time. Label the axes correctly.



D/A

2) In the last problem, please find

- The force exerted by my breaks
- The work done by my breaks and the average power.
- Was energy conserved in this process? How?

a) $F = ma$

$$F = (70 + 10 \text{ kg}) \left(-5 \frac{\text{m}}{\text{s}^2} \right) \\ = -400 \text{ N}$$

b) $W = F \cdot d$
 $= 400 \text{ N} \cdot 10 \text{ m}$
 $= 4000 \text{ J}$

$$P_{\text{ave}} = \frac{4000 \text{ J}}{2 \text{ s}} = 2000 \text{ J/s}$$

Energy

$$W = |KE_f - KE_i| \\ = \left(0 - \frac{1}{2} (80 \text{ kg}) \left(10 \frac{\text{m}}{\text{s}} \right)^2 \right) \\ = 4000 \text{ J}$$

Because KE is decreasing

c) Energy was conserved, but in different forms.

Kinetic energy was turned into heat (thermal energy) by the friction of the breaks.

$\frac{D}{A}$