1. A 10kg block is traveling at 2m/s, how much momentum/Kinetic energy does the block have?

$$P = MV$$
$$10 \cdot 2 = 20$$

2. A 10kg block is traveling at 2m/s and bounces off a wall going in the opposite direction at 1m/s
   a. What is the change in momentum? $P = M\Delta V = 10(-1-2)$
   $$10(-3) = -30$$
   $$or$$
   $$30$$

   b. What is the impulse caused by the wall? $P \rightarrow \Leftarrow I$ wall $\boxed{-30}$

   c. What is the change in energy?

   $$KE = \frac{1}{2}M\Delta V^2 \qquad KE = \frac{1}{2}10(1)^2 = 5J$$
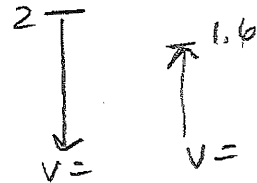   Not a vector ⟶ $\Delta V = 1$

3. A 0.80 kg ball was dropped from a height of 2.0 m above the ground. It rebounded to a height of 1.6 m. The contact between the ball and the ground lasted for 0.045 s.

   a. What was the impulse applied to the ball?

   $$\Delta P = I = .8(5.6 - 6.3) = 1$$
   $$= 9.52 Ns$$

   b. What was the average net force on the ball?

   $$\frac{-5.3}{.045} = \boxed{117N}$$

   $$2\downarrow \qquad \uparrow 1.6$$
   $$V= \qquad V=$$

   $$\sqrt{2 \cdot 10 \cdot 2}$$
   $$= 6.3$$
   $$\sqrt{2 \cdot 10 \cdot 1.6}$$
   $$= 5.6$$

   $$PE = KE$$
   $$\sqrt{2gh} = V$$

4. An 800 kg car travelling at $10 \frac{m}{s}$ comes to a stop in 0.50 s in an accident.

   a. What was the impulse applied to the car?

   $$\Delta P = I = 800 \cdot 10 = 8000 kg$$

   b. What was the average net force on the car as it came to a stop?

   $$\frac{I}{t} = F \qquad \frac{8000}{.5} = 16000 N$$