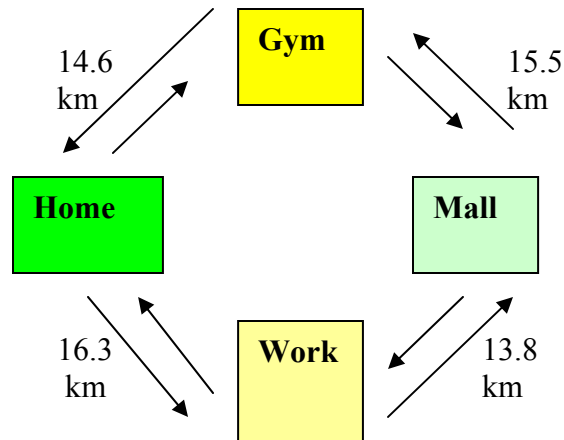


Speed, Acceleration and Momentum Review

Teachers Document

Solve the following problems. You must show your work.

Day one



1. The diagram represents the total travel a student makes on a Saturday. Answer the following questions.

- a. If the student travels from his home to the gym in 20 **minutes**, what is his speed in **km/hr**? (Don't forget to check units!!!)

$$\frac{14.6 \text{ km}}{20 \text{ min}} \times \frac{1}{1} \times \frac{60 \text{ min}}{1 \text{ hr}} = \frac{43.8 \text{ km}}{\text{hr}}$$

- b. What is the student's speed in **km/min** when he travels from the Mall to Work in 24 **minutes**?

$$\frac{15.5 \text{ km}}{24 \text{ min}} \times \frac{1}{1} = \frac{0.65 \text{ km}}{\text{min}}$$

- c. If the student needed to travel from the gym to work by way of the mall and could travel at a speed of 40.0 **km/hr**, how long would it take in **hours**? In **minutes**?

$$\text{Distance} = 15.5 \text{ km} + 13.8 \text{ km} = 29.3 \text{ km}$$

$$\frac{29.3 \text{ km}}{40.0 \text{ km/hr}} = 0.733 \text{ hr}$$

$$\frac{0.733 \text{ hr}}{1 \text{ hr}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 44.0 \text{ min}$$

Day Two

2.



- a. If the car shown above is traveling at 50. **m/sec** and comes to a complete stop in 180 **seconds**, what is the acceleration of the driver who is using vehicle restraints?

$$\text{Acceleration} = \frac{(\text{Velocity}_{\text{final}} - \text{Velocity}_{\text{initial}})}{\text{Change in time}}$$

$$\left(\frac{0 \text{ m} - 50 \text{ m}}{\text{sec} \quad \text{sec}} \right) = \frac{-50 \text{ m}}{\text{sec}} \times \frac{1}{180 \text{ sec}} = \frac{-0.28 \text{ m}}{\text{sec}^2}$$

- b. If the car travels 225 **km** in 85 **minutes**. What was its average speed in **km per hour**? (Don't forget to check units!!!)

$$\frac{225 \text{ km}}{85 \text{ min}} \times \frac{1 \text{ hr}}{60 \text{ min}} = \frac{159 \text{ km}}{\text{hr}}$$

- c. When the car is moving at 24.4 **m/sec** and has a momentum of 3.33×10^4 **kg · m/sec**. What is the mass of the car?

$$\frac{3.33 \times 10^4 \text{ kg} \cdot \text{m}}{\text{sec}} \times \frac{\text{sec}}{24.4 \text{ m}} = \frac{1363 \text{ kg}}{}$$