

1. Is it possible for the car below to be in motion?



- A. Yes, because the forces are equal and opposite, the car must be changing directions.
- B. Yes, it is possible for the car to be moving at a constant velocity.
- C. Yes, there is 40,000N of force acting on the car, so the car is accelerating.
- D. No, the forces are balanced, so the car must be at rest.

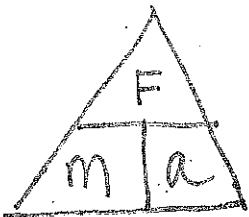
2. Write the SI (metric) unit.

- a. Speed m/s
- b. Acceleration m/s²
- c. Mass kg or g
- d. Force N or
- e. Time s
- f. Distance m

kg·m/s

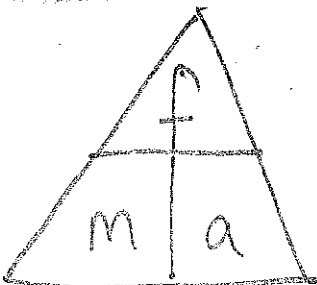
Complete the following problems. Be sure to show your work including units!

3. What is the mass of an object if a force of 34N produces an acceleration of 4.0m/s²?



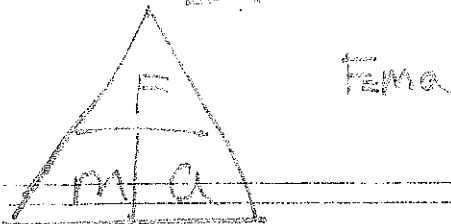
$$m = \frac{F}{a} = \frac{34\text{N}}{4.0\text{m/s}^2} = 8.5\text{kg}$$

4. What is the acceleration of a boy on a skateboard if the net force on the boy is 15N? The total mass of the boy and the skateboard is 58kg.



$$a = \frac{F}{m}$$

5. What net force is needed to accelerate a 55 kg cart at 15m/s^2 ?



6. Suppose you doubled the force acting on an object. In what way could you change its mass to keep its acceleration unchanged?

Double the mass

7. Describe the difference between an object's speed and an object's velocity?

Speed - Distance an object travels in one unit of time.

Velocity - speed in a given direction.

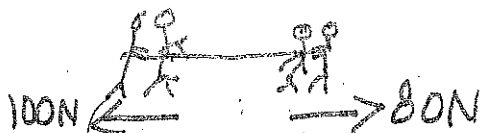
8. Write out Newton's Laws and give an example of each. - Look these up in your interactive journal.

1st Law Law of Inertia

2nd Law $F = ma$

3rd Law Action Reaction

9. In a tug of war, when one team is pulling with a force of 100 N and the other 80 N, what is the net force?



$$100\text{N} - 80\text{N} = 20\text{N}$$

10. What is the sum of all forces acting on an object called? - Net force

11. Define friction and give an example.

The force one surface exerts on another

12. Assuming there is no air resistance, how does mass affect acceleration due to gravity? (Hint: Think of the bowling ball and feather video.)

Mass has no effect on the acceleration due to gravity

13. What is the difference between mass of an object and weight of an object?

Mass - the amount of matter in an object. Weight is the force of gravity on an object.

14. The net force acting on a car rolling down a ramp is the addition of three forces. One of the forces is the ramp pushing up to support the car.

a. Name the two other forces acting on the car.

friction and gravity

b. Which of these two forces helps the motion of the car?

gravity

c. Which of these two forces opposes the motion of the car?

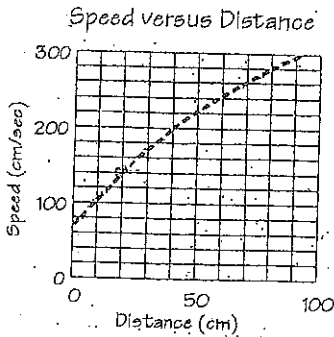
friction

15. Define inertia. Tendency of an object to resist change in its motion.

16. What must be examined to know if an object is in motion?

all the forces acting on an object

17. Use the graph below to predict the speed of the car at the following distances: 20cm, 35cm, 60cm, 80cm.



20 cm 140 cm/sec

35 cm

60 cm

80 cm

18. An RV travels 45km east and stays the night at a KOA. The next day it travels for 3 hours to the north, traveling 110km. What is the displacement over the two days for the RV?



$$a^2 + b^2 = c^2$$

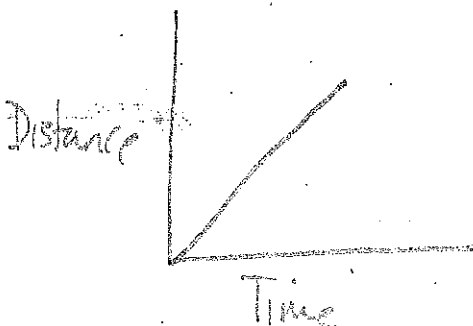
$$110^2 + 45^2$$

$$12,100 + 2025 = \sqrt{14125} = 118.8 \text{ km NE}$$

19. What is the total distance traveled during the Indy 500? What is the total displacement?

500 miles, 0

20. A woman goes to a store 3 blocks away from her home. She walks in a straight line and at a steady pace. Draw a position vs. time graph of her walk. Regard home as start.



21. The distance traveled by two crawling babies is shown below.

| Time (s) | Baby Sarah Distance (m) | Baby Scott Distance (m) |
|----------|-------------------------|-------------------------|
| 0 | 0 | 0 |
| 1 | 0.5 | 0.4 |
| 2 | 1 | 0.8 |
| 3 | 1.5 | 1.2 |
| 4 | 2 | 1.6 |

A. Graph the information above. Be sure to include a title and correctly label both axes.

B. Calculate the slope of each line.

C. Calculate each baby's speed.

