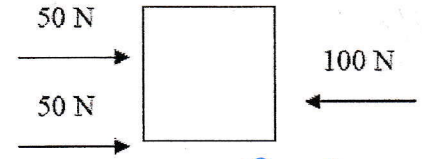
**When forces are in the SAME direction you ADD

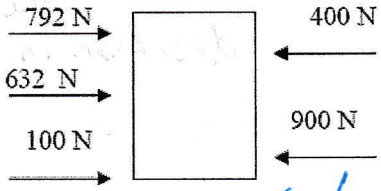
**When forces are in DIFFERENT directions you SUBTRACT

Find the net force and direction for each of the problems below.



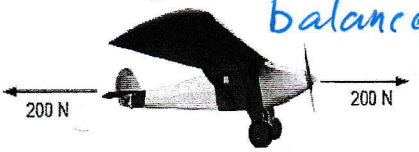
Net Force 0 N

Balanced

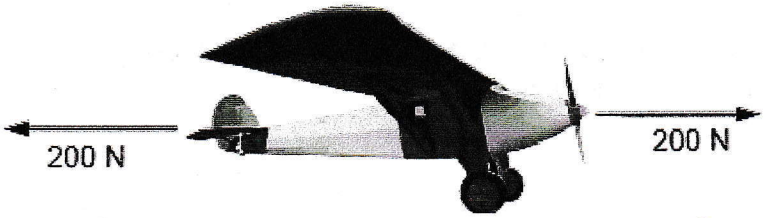


Net Force 224 N

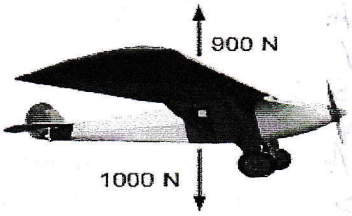
unbalanced



0 N balanced



0 N Balanced.

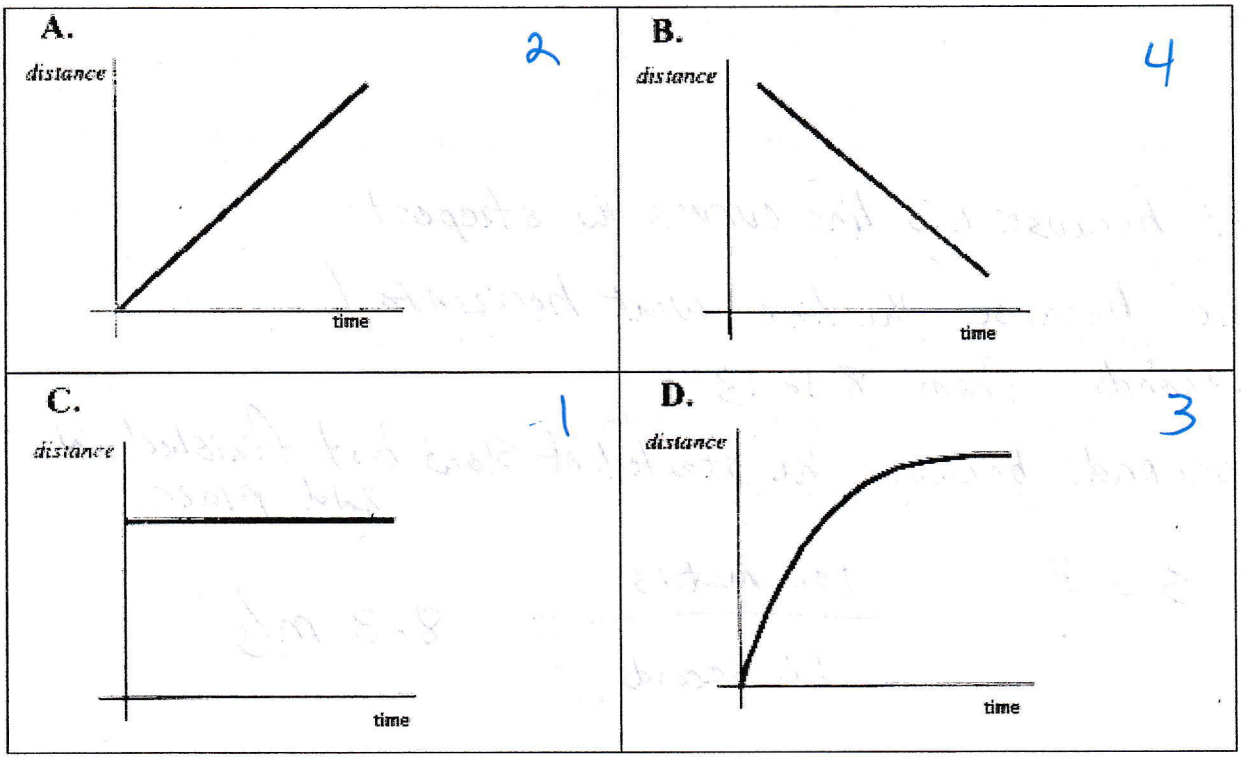


100 ↓ unbalanced

Graphs

Descriptions:

1. The car is stopped.
2. The car is traveling at a constant speed.
3. The speed of the car is decreasing.
4. The car is coming back.



Graph A matches description 2 because the line shows a consistant speed

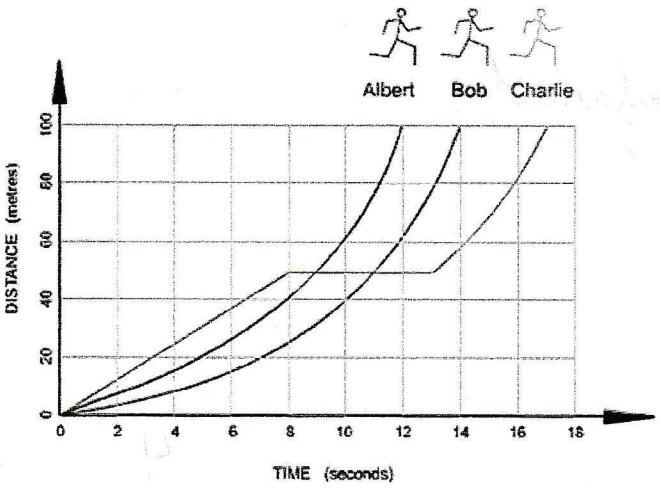
Graph B matches description 4 because the line showing the object coming back & returning

Graph C matches description 1 because the horizontal line is showing no movement.

Graph D matches description 3 because the curved line is showing a decrease in speed.

Speed, Velocity, or Acceleration Place an S to indicate speed, V to indicate velocity, and A to indicate acceleration.

A A motorcycle traveling 35 mi/hr slows as it approaches a stop sign.
V A car is traveling west at 45 mph.
S A dog is walking 5 m/sec.
V A bike racer travels 17 mi/hr in a southerly direction.
A A car speeds up to make a green light.
S A tennis ball is hit by a tennis racket at 56 mi/hr to an opponent on the other side of the court.
V A goose is traveling 22 mi/hr toward Canada during spring.
V A plane is flying northwest at 275 km/hr.



Look at the graph above. It shows how three runners ran a 100-meter race. Which runner won the race? Explain your answer.

Albert because his line curves the steepest

Which runner stopped for a rest? Explain your answer.

Charlie because the line went horizontal

How long was the stop? Explain your answer.

5 seconds from 8 to 13

How long did Bob take to complete the race? Explain your answer.

14 seconds because he started of slow but finished in 2nd place.

Calculate Albert's average speed. (Figure the distance and the time first!)

$S = \frac{D}{T}$ $\frac{100 \text{ meters}}{12 \text{ seconds}} = 8.3 \text{ m/s}$

Name_____ Date_____ Class_____

Motion Review

Vocabulary

1. A push or a pull that changes an object's motion is called a(n) Force.
2. What is net force? The difference in opposing forces when combined
3. When a net force is zero this means we have balanced forces.
4. When the net force is a NON zero number this means we have un-balanced forces.
5. Unbalanced forces cause a change in motion.
6. Balanced forces do not cause a change in motion.
7. Speed is an object's rate of motion. You calculate Speed by taking the distance and dividing it by the time.
8. When an object has no motion it is at Rest.
9. A rate of motion in a specific direction is called Velocity.
10. The CHANGE in speed or direction is called Acceleration.

Calculations

****** Force= Mass x Acceleration**

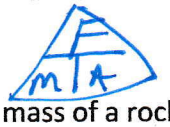
11. A 10 kg bowling ball would require what force to accelerate it down the alleyway at a rate of 3 m/s^2?

$F = M \times A$ $\quad 10\,kg \times 3\,m/s = 30\,kg/N$ (OR)

12. What is the acceleration of a car stopping with 250 N of force if it has a mass of 2500 kg?

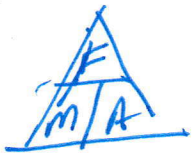
$A = \frac{F}{m}$ $\quad \frac{250\,N}{2500\,kg} = .1\,m/s^2$

13. What is the mass of a truck if it is accelerating at a rate of 5 m/s^2 and it hits a parked car with a force of 14,000 N?



$M = \frac{F}{A}$ $\quad \frac{14000}{5} = 2,800\,N$

14. What is the mass of a rock falling if it hits the ground with a force of 147 N with an acceleration of 9.8 m/s^2?



$\frac{147}{9.8} = 15\,N$