Name _____

Practice Problem Set F=ma ⟹ FORCE = MASS x ACCELERATION

Plug in the given values for Force/Mass/Acceleration to solve.
Remember, **mass is in kg** - - **force in in N** (newtons) - - **acceleration is in m/s^2**

1. How much force is needed to accelerate a 66 kg skier at 2 m/sec^2?

2. What is the force on a 1000 kg elevator that is falling freely at 9.8 m/sec^2?

3. What is the acceleration of a 50 kg object pushed with a force of 500 newtons?

4. The mass of a large car is 1000 kg. How much force would be required to accelerate the car at a rate of 3 m/sec^2?

5. A 50 kg skater pushed by a friend accelerates 5 m/sec^2. How much force did the friend apply?

6. A force of 250 N is applied to an object that accelerates at a rate of 5 m/sec^2. What is the mass of the object?

7. A bowling ball rolled with a force of 15 N accelerates at a rate of 3 m/sec^2; a second ball rolled with the same force accelerates 4 m/sec^2. What are the masses of the two balls?

8. If a 60 kg person on a 15 kg sled is pushed with a force of 300 N, what will be person's acceleration?

9. A force of 20 N acts upon a 5 kg block. Calculate the acceleration of the object.

10. An object of mass 300 kg is observed to accelerate at the rate of 4 m/s^2. Calculate the force required to produce this acceleration.

SOLUTIONS TO 1-10 FORCE PROBLEMS

1. How much force is needed to accelerate a 66 kg skier at 2 m/sec^2?
f=ma f= 66 x 2 f = 132 N

2. What is the force on a 1000 kg elevator that is falling freely at 9.8 m/sec^2?
F= ma f= 1000 x 9.8 f=9,800 n

3. What is the acceleration of a 50 kg object pushed with a force of 500 newtons?
F= ma 500 = 50(a) a= 10 m/s^2

4. The mass of a large car is 1000 kg. How much force would be required to accelerate the car at a rate of 3 m/sec^2?
F= ma f= 1000 x 3 f= 3000 N

5. A 50 kg skater pushed by a friend accelerates 5 m/sec^2. How much force did the friend apply?
F = ma f= 50 x 5 f= 250 N

6. A force of 250 N is applied to an object that accelerates at a rate of 5 m/sec^2. What is the mass of the object?
F = ma 250N=(m)5 m= 50kg

7. A bowling ball rolled with a force of 15 N accelerates at a rate of 3 m/sec^2; a second ball rolled with the same force accelerates 4 m/sec^2. What are the masses of the two balls?
F= ma 15N= (m)3 m=5kg 15N = (m)4 m=3.75kg

8. If a 60 kg person on a 15 kg sled is pushed with a force of 300 N, what will be person's acceleration?
F=ma 300N=(60+15)(a) a=4 m/s^2

9. A force of 20 N acts upon a 5 kg block. Calculate the acceleration of the object.
F=ma 20N=5(a) a=4 m/s^2

10. An object of mass 300 kg is observed to accelerate at the rate of 4 m/s^2. Calculate the force required to produce this acceleration.
F=ma F=300 x 4 f= 1200N