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PROBLEM-SOLVING

Name: _____ Year level/Section: _____
Date Submitted: _____ Score: _____

Direction: Solve the following questions related to Newton's 3 Laws of Motion.

1. What net force is required to accelerate a truck at a rate of 8 m/s^2 if the car has a mass of 3,000 kg?

Given:

Required:

Solution:

Answer:

2. Sandy has a car that accelerates at 24 m/s^2. If the car has a mass of 25 kg, how much force does the car produce?

Given:

Required:

Solution:

Answer:

3. What is the acceleration of the baseball if it has a mass of 0.90 kg and hits the catcher's glove with a force of 22 N?

Given:

Required:

Solution:

Answer:

4. What is the mass of a tractor if it produces a force of 20,000 N while accelerating at a rate of $8\,m/s^2$?

Given:

Required:

Solution:

Answer:

5. Your mother's car has a mass of 1,000 kg. If her car produces a force of 5,000 N, how fast will it accelerate?

Given:

Required:

Solution:

Answer:

Key Answers (For Teachers Only)

1. What net force is required to accelerate a truck at a rate of 8 m/s^2 if the car has a mass of 3,000 kg?

   Given: α= 8 m/s^2
   m= 3,000 kg
   Required: Force required to accelerate a truck
   Solution: $f_{net=ma}$
   $f_{net=(3{,}000\ \text{kg})(8\ m/s^2)}$
   $\boldsymbol{f_{net=24{,}000\ N}}$
   Answer: The net force required to accelerate a truck is $24{,}000\ N$.

2. Sandy has a car that accelerates at 24 m/s^2. If the car has a mass of 25 kg, how much force does the car produce?

   Given: α= 24 m/s^2
   m= 25 kg
   Required: The net force of the car.
   Solution: $f_{net=ma}$
   $f_{net=(25\ kg\ )(24\ m/s^2)}$
   $\boldsymbol{f_{net=600\ N}}$
   Answer: The force that the car produce is 600 N.

3. What is the acceleration of the baseball if it has a mass of 0.90 kg and hits the catcher's glove with a force of 22 N?

   Given: m= 0.90 kg
   $\boldsymbol{f_{net=22\ N}}$
   Required: acceleration of the baseball
   Solution: $a = \frac{f_{net}}{m}$
   $a = \frac{\mathbf{22\ N\ (kg \bullet \frac{m}{s^2})}}{0.90\ \text{kg}}$
   $\boldsymbol{a = 24.44\ m/s^2}$
   Answer: *The acceleration of the baseball is* $\boldsymbol{24.44\ m/s^2}$

4. What is the mass of a tractor if it produces a force of 20,000 N while accelerating at a rate of $8m/s^2$?

   Given: a= 8 m/s^2
   $\boldsymbol{f_{net}}$=20 000 N

   Required: mass of a tractor
   Solution: $m = \frac{f_{net}}{a}$
   $m = \frac{\mathbf{20\ 000\ N\ (kg \bullet \frac{m}{s^2})}}{8\ m/s^2}$
   $m = 2\ 500\ kg$
   Answer: *The mass of the tractor that produces a force of 20,000 N is 2 500 kg.*

5. Your mother's car has a mass of 1000 kg. If her car produces a force of 5,000 N, how fast will it accelerate?

Given: m=*1 000 kg*

$\boldsymbol{f_{net}= 5{,}000\ N}$

Required: acceleration of the car

Solution: $a = \frac{f_{net}}{m}$

$$a = \frac{\mathbf{5\ 000\ N\ (kg \cdot \frac{m}{s^2})}}{\mathbf{1\ 000\ kg}}$$

$$a = 5\ \boldsymbol{m/s^2}$$

Answer: *The acceleration of the car is* $5\ \boldsymbol{m/s^2}$.