

1) Newton's Third Law of Motion

All forces come in pairs- Action-Reaction pairs of forces.

2) Newton's First Law of Motion

Net Force = sum of all of the forces acting on an object.

Net Force = Add all forces

3) Newton's Second Law of Motion

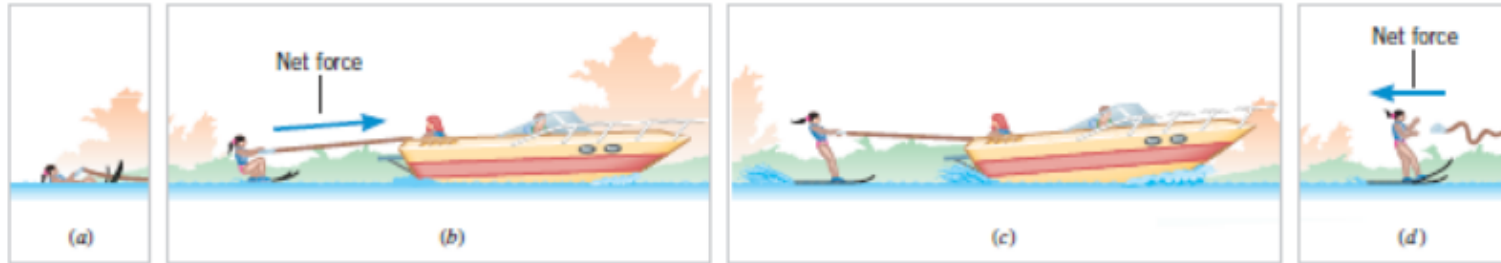
Net Force = Mass x Acceleration

$$F_{\text{net}} = m \times a$$

4) Equilibrium:

Net Force = 0 N,

Acceleration = 0 m/s/s (No change in velocity)

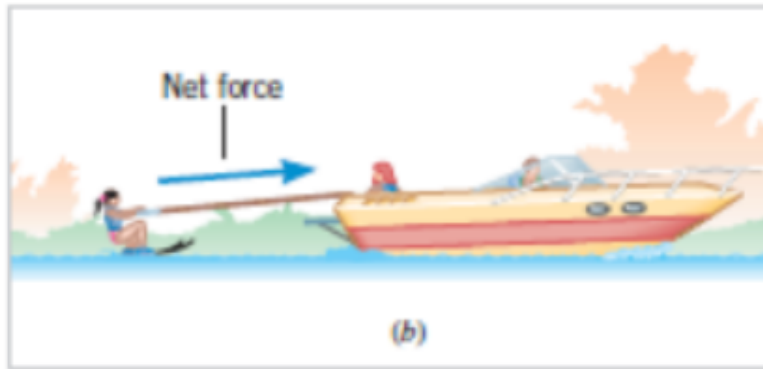


In situation (a): the girl is **not** in motion:

Acceleration = **0** m/s/s.

Net force = **0** N.

Equilibrium

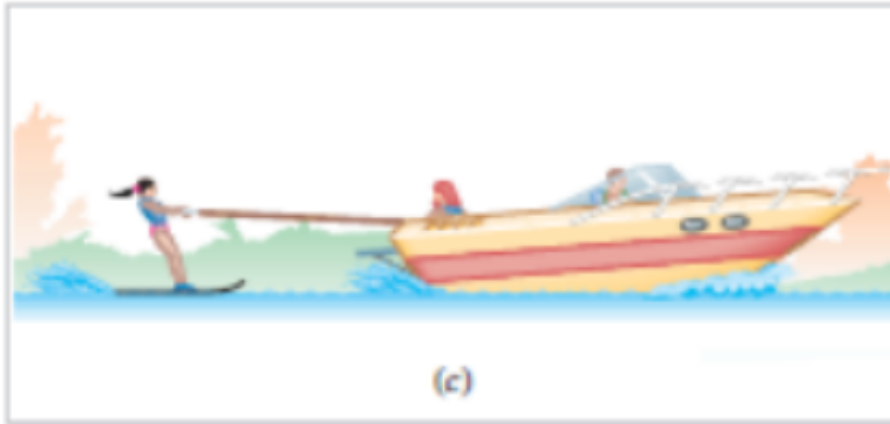


In situation (b): There a change in the speed. The girl is accelerating:

Acceleration **#** 0 m/s/s

Net force **#** 0 N.

Equilibrium: **No**



In situation (c): The girl is moving at a constant
Velocity: The **speed or direction does not change.**
Acceleration = 0 m/s/s
Net force = 0 N.
Equilibrium (**yes**).



In situation (d): the girl let the rope. She is falling back. Her velocity is changing.

Acceleration **#** 0 m/s/s

Net force **#** 0 N.

Equilibrium (No).