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IMPORTANT CONCEPTS IN BIOMECHANICS (Textbook pages 141–148)

1 Key Terms and Definitions


Define the key terms below in your own words.

Key Term	Definition
action–reaction	
centre of mass (gravity)	
gravity	
impact	
impulse	
inertia	
mass	
moment of inertia	
momentum	
net force	



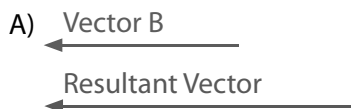
Newton's first law	
Newton's second law	
Newton's third law	
scalar quantity	
vector	
vector quantity	



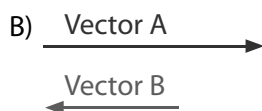
2 Vectors: From Head to Tail



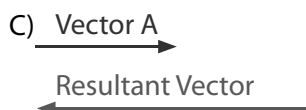
Vector quantities such as force are represented by arrows called vectors, which have both *magnitude* (large or small) and *direction*. If the head of a vector points in the direction of the force, and the length of the vector is proportional to the magnitude of the force, use simple vector algebra to complete the following examples using the head-to-tail method. All answers should include a *vector A*, *vector B*, and *resultant vector*.



Answer:



Answer:



Answer:



3 Newton's Laws



A) *Inertia* is the reluctance of a body to change its state of motion. *Moment of inertia* (I) is the measure of a body's inertia to angular motion.

For each of the following examples, identify

- the object that is rotating;
- the relative magnitude of the moment of inertia (small, medium, large); and
- what external forces could be used to change the state of motion of the object.

Example	Rotating Object	Relative Magnitude of the Moment of Inertia	External Forces to Change State of Motion
Opening a door			
A plane's propeller			
Somersault			
Twisting dive			
Lower limb during running			



B) For linear movements, the acceleration (a) a body experiences is directly proportional to the force (F) causing it and takes place in the same direction as the force ($F = m \times a$, where m is the mass of the body). In your own words, explain the graphs below illustrating the relationships between force, mass, and acceleration.

