PH 221 Week 7

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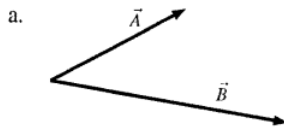
Winter 2025

This material is borrowed/adapted from Chapter 9 of the *Student Workbook* for *Physics for Scientists and Engineers*.
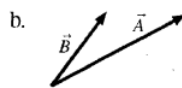
R7-1: Visual Dot Product Practice

(a) If $\vec{A} \cdot \vec{B} = 0$, can you conclude that one of the vectors has zero magnitude? Explain.

(b) For each pair of vectors, is the sign of $\vec{A} \cdot \vec{B}$ positive $(+)$, negative $(-)$, or zero (0)?
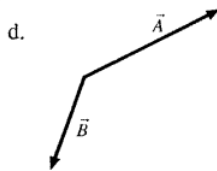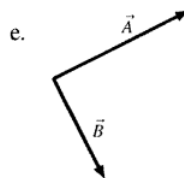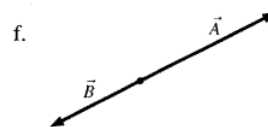

(c) Each of the diagrams below shows a vector $\vec{A}$. Draw and label a vector $\vec{B}$ that will cause $\vec{A} \cdot \vec{B}$ to have the sign indicated.

R7-2: Lifting Boxes

Rudy picks up a 5 kg box and lifts it straight up, at constant speed, to a height of 1 m. Beth uses a rope to pull a 5 kg box up a 15° frictionless slope, at constant speed, until it has reached a height of 1 m. Which of the two does more work? Or do they do equal amounts of work? Explain.

R7-3: Spring Reasoning

A spring has an unstretched length of 10 cm. It exerts a restoring force F when stretched to a length of 11 cm.

(a) For what length of the spring is its restoring force $3F$?

(b) At what compressed length is the restoring force $2F$?