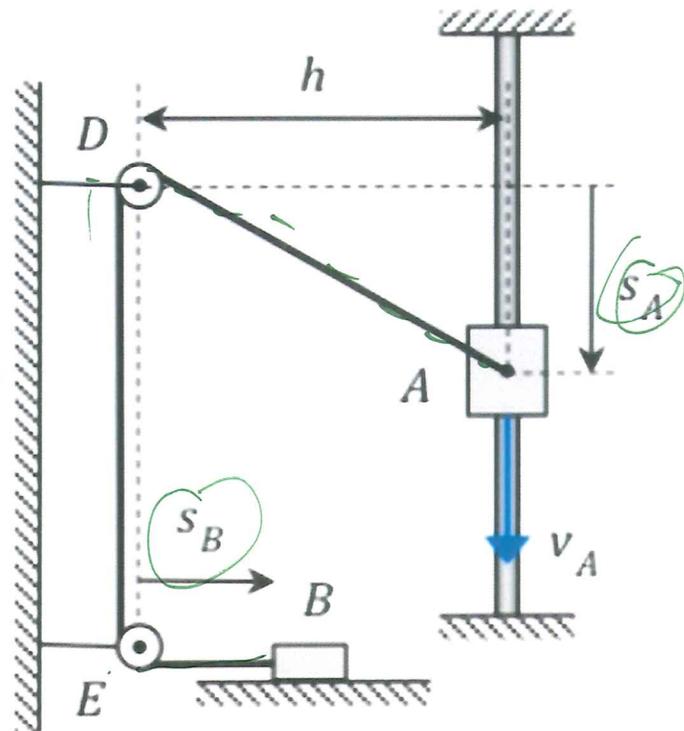- Blocks A and B are connected by an inextensible cable. Assume that the pulleys over which the cable is pulled are small. Block A is moving downward with a speed of v_A .Let v_B represent the speed of block B. Indicate below the most accurate description of the relative sizes of the **speeds** of blocks A and B:

  ○ (a) $v_A > v_B$

  ○ (b) $v_A = v_B$

  ○ (c) $v_A < v_B$

  ○ (d) Not enough information

$$L = S_B + G + \sqrt{h^2 + S_A^2} = (h^2 + S_A^2)^{1/2}$$

$$\downarrow \; d/dt$$

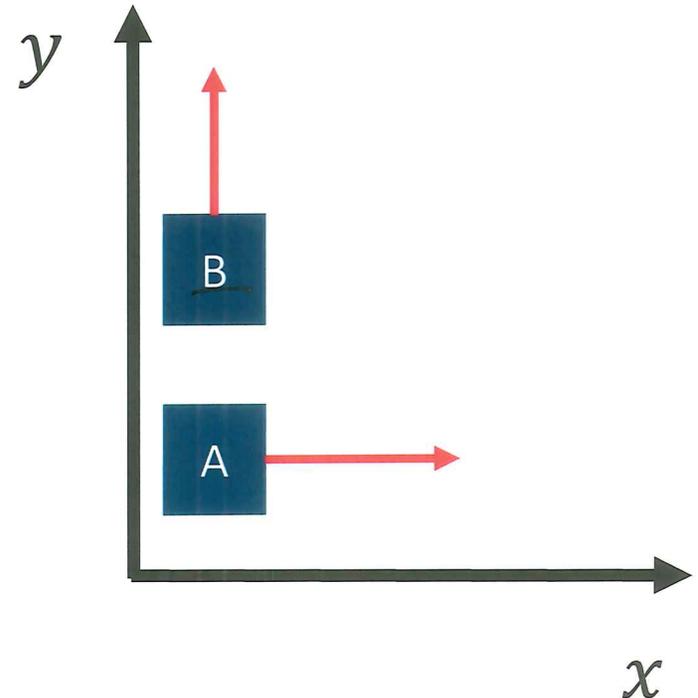$$0 = V_B + \frac{2\,S_A\,V_A}{2\sqrt{h^2 + S_A^2}} \qquad \frac{S_A}{\sqrt{h^2 + S_A^2}} < 1$$

- Block B is traveling in the +y direction at a speed v_B while block A is traveling in the +x direction at a speed v_A according to a fixed observer. What is the velocity of A relative to B?

  - (a) $\vec{v}_{A/B} = v_A \hat{\imath}$
  - (b) $\vec{v}_{A/B} = -v_b \hat{\jmath}$
  - (c) $\vec{v}_{A/B} = v_A \hat{\imath} + v_b \hat{\jmath}$
  - (d) $\vec{v}_{A/B} = v_A \hat{\imath} - v_b \hat{\jmath}$

$$\vec{v}_{A/B} = \vec{v}_A - \vec{v}_B$$
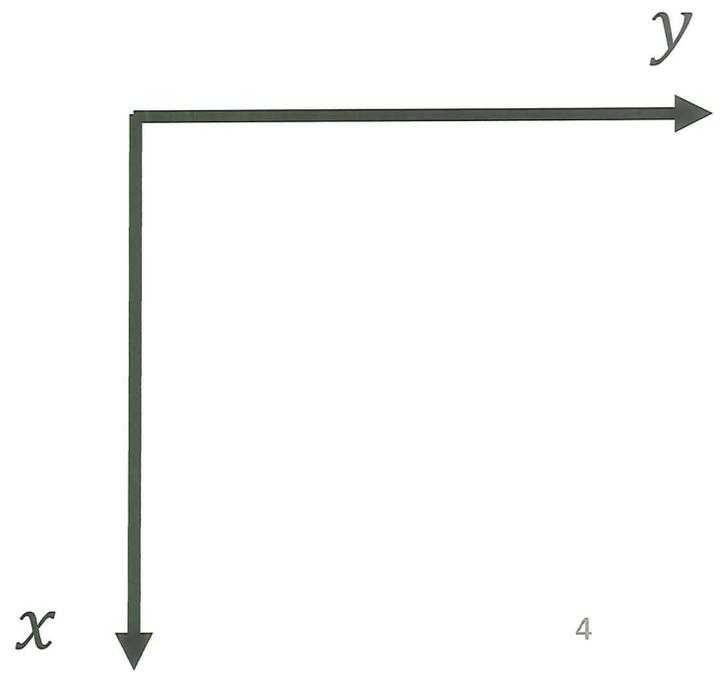
$$\vec{v}_{A/B} = v_A \hat{\jmath} - v_B \hat{\jmath}$$

3

- Using the coordinate system shown mark the answer that indicates the direction of positive $\hat{k}$ and direction of positive rotation.

  - (a) $\hat{k}$ out of page, clockwise rotation +
  - (b) $\hat{k}$ into page, clockwise rotation +
  - (c) $\hat{k}$ out of page, CCW rotation +
  - (d) $\hat{k}$ into page, CCW rotation +

$$\hat{i} \times \hat{j} = \hat{k}$$

$$\begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ \hat{i} & \hat{j} & \hat{k} \end{vmatrix} = \hat{k}$$

y

x
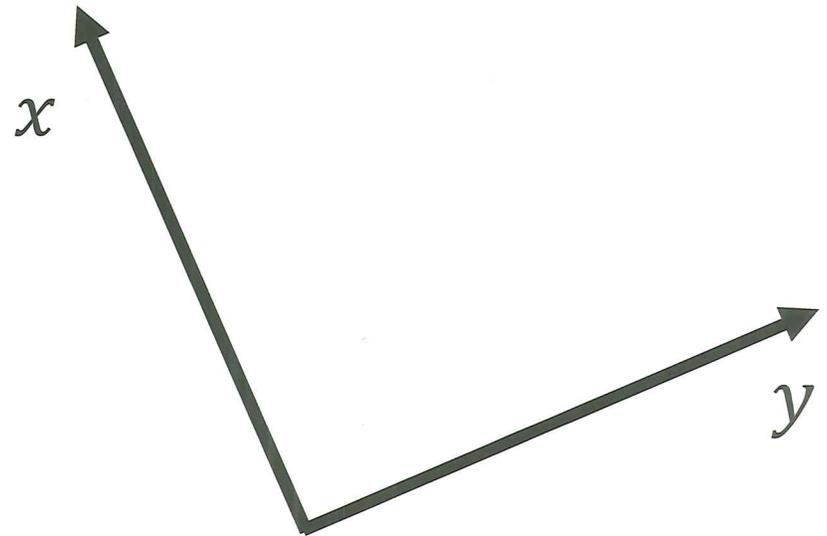
- Using the coordinate system shown mark the answer that indicates the direction of positive $\hat{k}$ and direction of positive rotation.

  - (a) $\hat{k}$ out of page, clockwise rotation +
  - (b) $\hat{k}$ into page, clockwise rotation +
  - (c) $\hat{k}$ out of page, CCW rotation +
  - (d) $\hat{k}$ into page, CCW rotation +

$$\hat{i} \times \hat{j} = \hat{k}$$

x

y

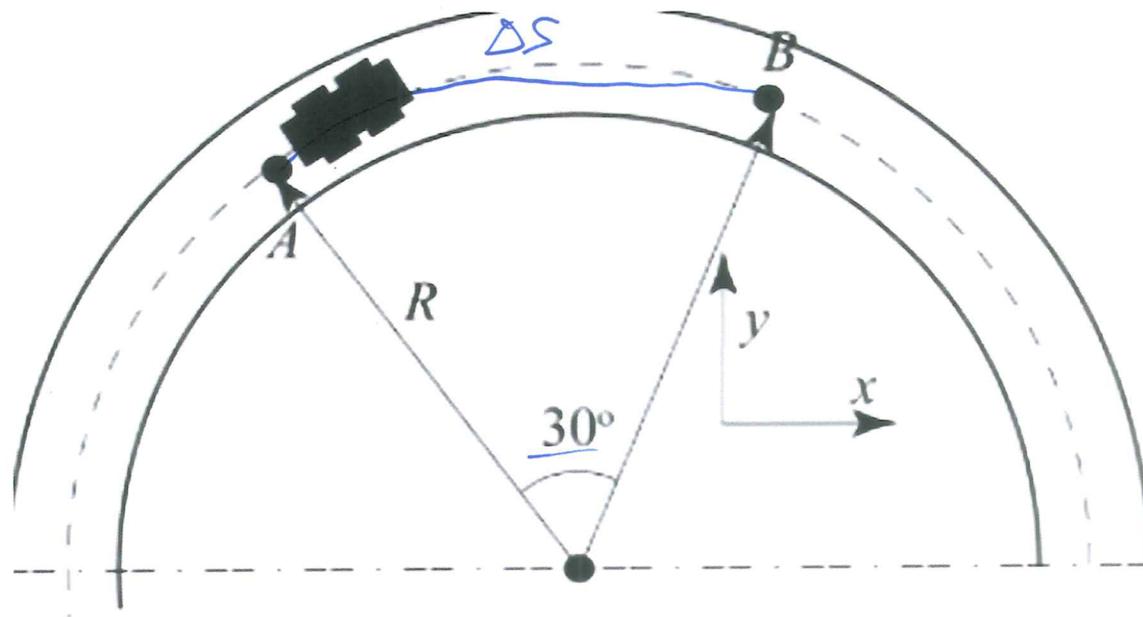- If the radius, R, of the track is 10 m find the length the car travels from A to B for the following.
  - (a) 300 m
  - (b) 5.24 m
  - (c) 30 m
  - (d) 1.66 m
  - (e) Not enough info

$$\Delta s = R \Delta\theta = 10 m (30°) \cdot \frac{\pi \, rad}{180°}$$