Wednesday Reading Assessment: Unit 2, Two-dimensional kinematics

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1 Memory Bank

- $|\vec{x}| = \sqrt{a^2 + b^2}$ ... Pythagorean theorem for obtaining vector magnitude.
- $\theta = \tan^{-1}(b/a)$ ... Obtaining the angle between vector and x-axis.
- $a = |\vec{x}| \cos(\theta)$ ... Obtaining the x-component with trigonometry.
- $b = |\vec{x}| \sin(\theta)$ ... Obtaining the y-component with trigonometry.

2 Chapter 3 - Two-Dimensional Kinematics

1. Suppose an object is launched straight upwards. Which of the following is true?
   - A: The acceleration is negative the whole time.
   - B: The acceleration is negative, then zero, then positive.
   - C: The acceleration is negative, then zero, then negative.
   - D: The acceleration is positive the whole time.
2. An object is moving at 10 m/s, and in 5 seconds, it comes to a stop. What is the acceleration?
   - A: 2 m/s^2
   - B: -2 m/s
   - C: -1 m/s^2
   - D: -2 m/s^2
3. Suppose an object is launched at a 30 degree angle with respect to the horizontal direction. Which of the following is true?
   - A: The horizontal acceleration is negative the whole time.
   - B: The vertical acceleration is negative, then zero, then positive.
   - C: The horizontal acceleration is negative, then zero, then negative.
   - D: The horizontal acceleration is zero the whole time.
4. An initial velocity vector is $\vec{v}_i = (3\hat{i} + 6\hat{j})$ m/s. What is the angle it makes with the x-axis? *Hint: draw it to be sure.*
5. An initial velocity vector is $\vec{v}_i = (-2\hat{i} - 4\hat{j})$ m/s. What is the angle it makes with the x-axis? *Hint: draw it to be sure.*