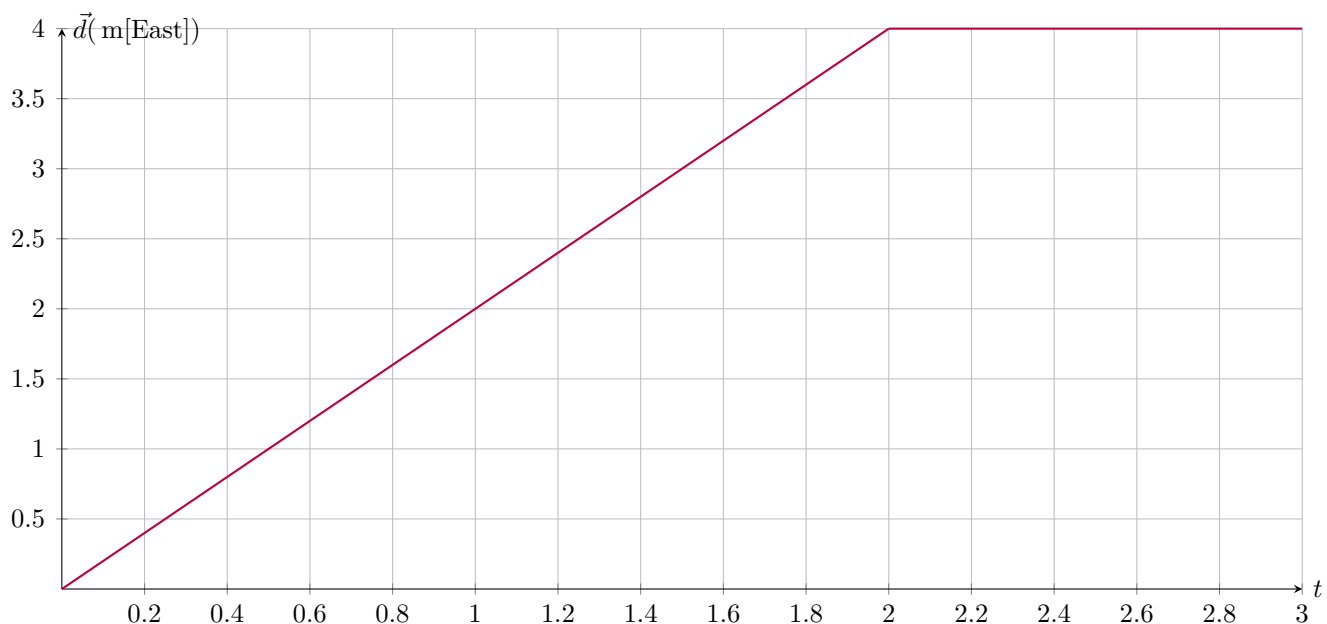


Question 1:

Answer the following True / False questions (**Assume [North],[East] is positive**)

- I throw a rock $d = 100$ m in the air and it returns to my hand in $\Delta t = 20$ s
 - The average speed of the ball was $v_{av} = 5$ m/s. (T / F)
 - The average velocity of the ball over $\Delta t = 20$ s was $\vec{v}_{av} = +5$ m/s[North]. (T / F)
- Suppose a rubber bullet travels at an average speed of $v_{av} = 600$ km/s and an average velocity of $v_{av} = +600$ km/s.
 - The distance it can cover in $\Delta t = 4$ s is $d = 2.4 \times 10^6$ m. (T / F)
 - Suppose the reference point is (0,0). If the gun is placed at $\vec{d}_i = +20$ m and then fired, then after $\Delta t = 2$ s, $\vec{d}_f = +1.2 \times 10^3$ m. (T / F)
- Suppose that the equation of motion for a rocket was $x = -4t - 6$. Then,
 - The rocket experienced uniform motion. (T / F)
 - The rocket experienced an average velocity of $\vec{v}_{av} = -10$ m/s. (T / F)
 - The rocket was initially [West] relative to the reference point. (T / F)
- Suppose that a frisbee has an average speed of v_{av} and that it takes Δt seconds to reach the end of the room.
 - Doubling the average speed of the frisbee will triple the distance it can travel. (T / F)
 - If I want the frisbee to reach the end of the room in $\frac{\Delta t}{3}$ seconds then I must triple the average speed. (T / F)
- Consider the Position V. Time graph for a body in motion below



- (a) The body had an average velocity of $\vec{v}_{av} = +2\text{ m/s}$. (T / F)
- (b) The body continued to move in the positive direction after $t = 2\text{ s}$. (T / F)
6. On an island there are three points A, B, C that lie on a straight line. There is no information of \vec{d}_{AB} , I would like to obtain this vector. I can obtain this vector if there exists information of,
- (a) $\vec{d}_{AC}, \vec{d}_{BC}$. (T / F)
- (b) $\vec{d}_{CA}, \vec{d}_{CB}$. (T / F)
- (c) $\vec{d}_{AC}, \vec{d}_{CB}$. (T / F)
- (d) $\vec{d}_{BC}, \vec{d}_{CA}$. (T / F)
- (e) The average speed and the time elapsed from A, B . (T / F)

Question 2:

Convert the following quantities to m/s

(a) 120 mi/h

(b) 400 km/h

(c) 368 m/min

(d) 678 in/min

Question 3:

Compute the **displacement** (or net displacement) given the position vectors. Assume that the reference point is $(0, 0)$ for all vectors.

(a) $\vec{d}_1 = 623 \text{ m[East]}, \vec{d}_2 = 412 \text{ m[West]}$

(b) $\vec{d}_1 = +123 \text{ km}, \vec{d}_2 = -81 \text{ km}, \vec{d}_3 = -121 \text{ km}, \vec{d}_4 = +610 \text{ km}, \vec{d}_5 = +42 \text{ km}, \vec{d}_6 = -742 \text{ m}.$

(c) $\vec{d}_i = 3 \text{ m[East]}, \vec{d}_f = 4 \text{ m[South]}$

Question 4:

Determine the sum/difference of the following vectors **geometrically**. Use the x -dimensional coordinate system.

(a) $\vec{A} = +3, \vec{B} = -6$

$$\vec{A} + \vec{B}$$

(b) $\vec{A} = +4, \vec{B} = +8, \vec{C} = -20, \vec{D} = -12$

$$\vec{A} + \vec{B} - (\vec{C} - \vec{D})$$

(c) $\vec{A} = +2, \vec{B} = +18, \vec{C} = -12, \vec{D} = -8, \vec{E} = +7$

$$-\vec{A} + \vec{B} + \vec{C} - \vec{D} + \vec{E}$$

Question 5:

Suppose a train took the following route the other day to the following cities; Oshawa, Pickering, Markham, London (Starting at Oshawa). Given below are all of his position vectors along the trip (All relative to **Toronto**). Compute his average velocity as well as his average speed if the trip took 3 h.

- $\vec{d}_{OSH} = 380 \text{ km[West]}$
- $\vec{d}_{PKR} = 434 \text{ km[West]}$
- $\vec{d}_{MRK} = 540 \text{ km[East]}$
- $\vec{d}_{LND} = 712 \text{ km[West]}$