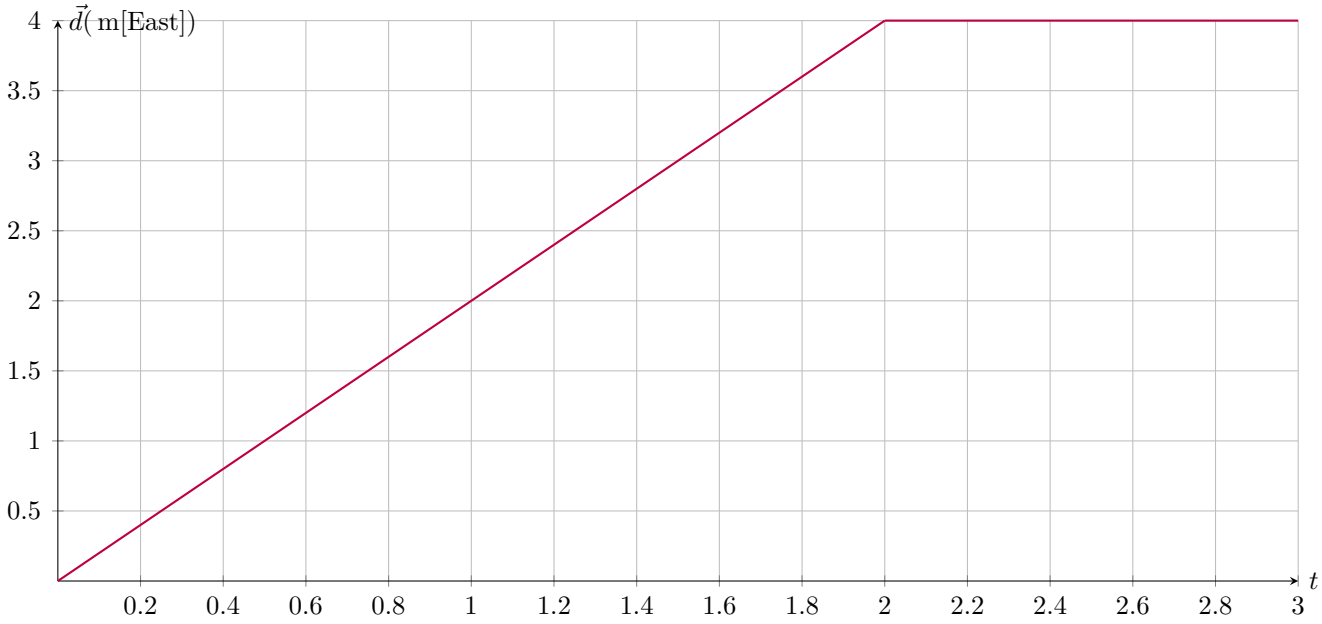
Question 1:

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

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



(a) The body had an average velocity of $\vec{v}_{av} = +2\,\mathrm{m/s}$. (T / F)

(b) The body continued to move in the positive direction after $t = 2\,\mathrm{s}$. (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 $\mathrm{m/s}$

(a) $120\,\mathrm{mi/h}$

(b) $400\,\mathrm{km/h}$

(c) $368\,\mathrm{m/min}$

(d) $678\,\mathrm{in/min}$

Question 3:

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

(a) $\vec{d_1} = 623\,\text{m[East]}$, $\vec{d_2} = 412\,\text{m[East]}$

(b) $\vec{d_1} = +500\,\text{km}$, $\vec{d_2} = -801\,\text{km}$, $\vec{d_3} = -120\,\text{km}$, $\vec{d_4} = +61\,\text{km}$, $\vec{d_5} = +400\,\text{km}$, $\vec{d_6} = -742\,\text{km}$.

(c) $\vec{d_i} = 601\,\text{m[Left]}$, $\vec{d_f} = 234\,\text{m[Right]}$