

12a

- What does the slope of a d-t graph represent?

- Slope = rise/run = change in position/time = $\Delta \vec{x}/t$
- $\vec{v} = \Delta \vec{x}/t$ so.....

slope = velocity

(the sign of the slope indicates the direction of motion)

- How do you determine if an object is at rest, constant speed, or changing speed?

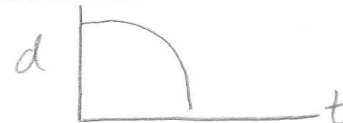
- At rest: velocity = 0 \Rightarrow slope = 0 \Rightarrow FLAT LINE



- Constant \vec{v} : constant slope \Rightarrow STRAIGHT LINE

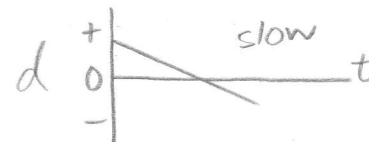
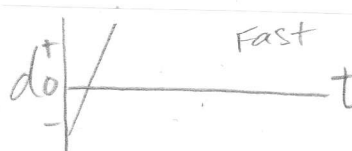


- Accelerating: changing slope \Rightarrow CURVED LINE
slowing down (gets flatter): speeding up (gets steeper):



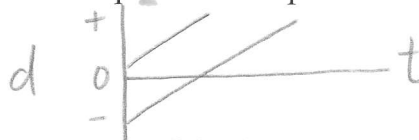
- How do you determine if the speed is slow or fast?

- Fast: STEEP (LARGE) SLOPE
- Slow: SMALL SLOPE

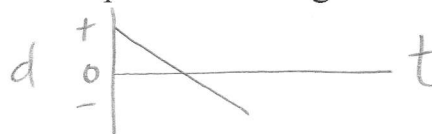


- How do you determine the direction in which the object is traveling (i.e. the direction of velocity)?

- Negative direction: NEGATIVE SLOPE
 - Positive direction: POSITIVE SLOPE
- constant speed in the positive direction:



- constant speed in the negative direction:



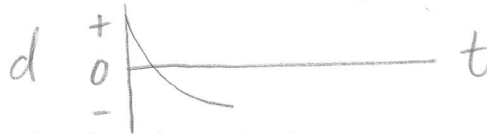
- gaining speed in the negative direction:



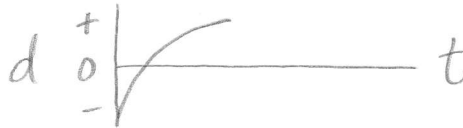
- gaining speed in the positive direction:



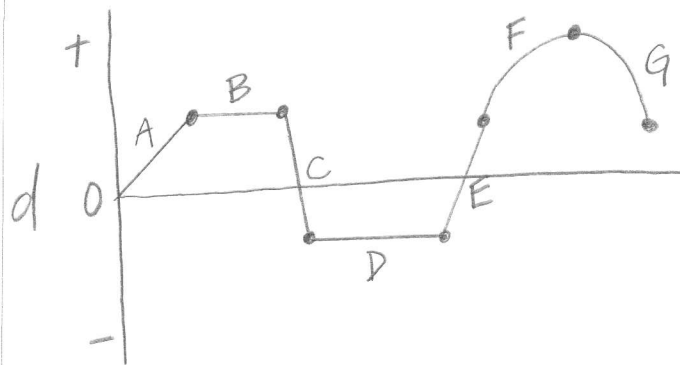
5. slowing down in the negative direction:



6. slowing down in the positive direction:



Practice #1 (try this on your own with your team): This depicts the motion of an object. Describe each motion during the time intervals indicated.



Answers:

A = constant speed; (+) direction

B = at rest

C = constant speed; (-) direction (FASTEST)

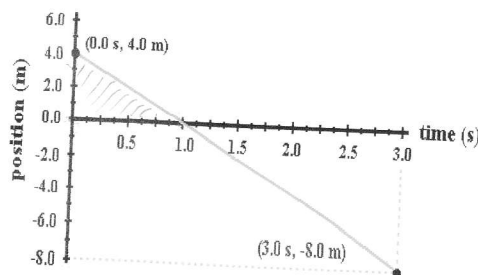
D = at rest

E = constant speed; (+) direction

F = slowing down; (+) direction

G = speeding up; (-) direction

Practice #2: Determine the velocity of this object:



$$\vec{v} = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{-8\text{m} - 4\text{m}}{3\text{s}} = \frac{-12\text{m}}{3\text{s}}$$

$$\boxed{\vec{v} = -4\text{m/s}}$$