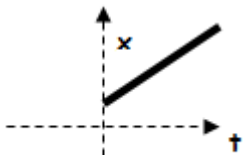


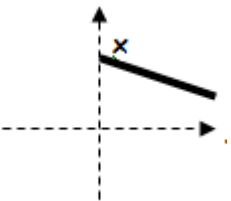
## KEY linear motion QQT

1. What does a vector have that a scalar does not?
  - a. Direction (velocity is a vector: 30 mph east, speed is a scalar: 30 mph)
2. What is a symbol you could use for: “change in position”? What units correspond to this quantity?
  - a.  $\Delta x$ ; meters
3. Why do we use only X to describe linear motion and not both X and Y?
  - a. Linear motion = 1 dimensional motion and a single variable X can describe motion in one direction
4. What is the difference between speed and velocity? Use examples to illustrate.
  - a. Velocity is a vector and requires some description of direction such as +, -, up, down, east, north, etc. speed only consists a magnitude, like 30 mph
5. What is the difference between distance and displacement? Use examples to illustrate.
  - a. Distance is a scalar and is how far you go along any path you take while displacement is a vector and describes how far you are from your starting position and in what direction too. Example: go around a  $\frac{1}{4}$  mile circular track four times and you went a distance of 1 mile and a displacement of zero.
6. What is instantaneous speed? Give a real world example.
  - a. How fast you are going at some instant in time. Your speedometer reads instantaneous speed.
7. The rate of position change (how fast your displacement is changing) is called?
  - a. Velocity
8. What is the name for rate of change of velocity?
  - a. Acceleration
9. What is the word that describes: change in position?
  - a. Motion
10. What does the symbol  $\Delta$  mean?
  - a. The change in something (final value – initial value)
11. What do the subscripts i and f mean?
  - a. Initial state and final state: for example  $V_i$  is initial velocity and  $V_f$  is final velocity.
12. What are the four steps in the four step method?
  - a. Draw a picture, list knowns AND unknowns, equation by itself, solve with units
13. What does the symbol V stand for?
  - a. Velocity or speed
14. What does the symbol  $\Delta x$  stand for?
  - a. Displacement or distance
15. What's do you know about the velocity below?



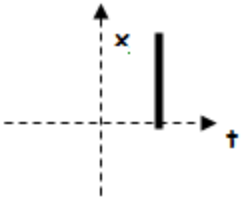
- a. It's positive, moving forward

16. What do you know about the velocity below?



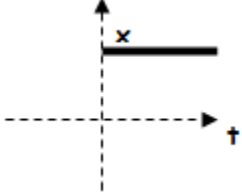
- a. It's negative, moving backward

17. Think about the definition of velocity and why would the graph below be impossible (vertical line)?



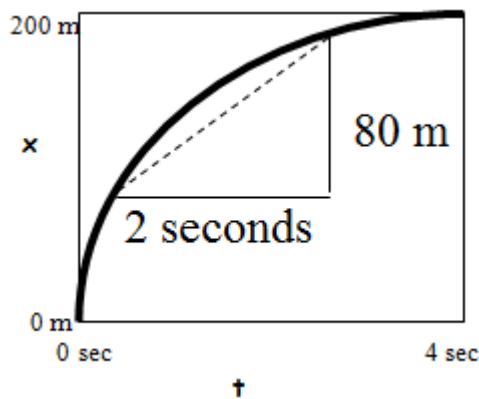
a. Velocity would be infinite ( $v = \Delta x / \Delta t$  where  $\Delta t$  would be zero (divide by zero!))

18. What does the graph below imply about the motion of the object graphed?



a. It's standing still

19. What's the average speed in the 2 second time interval shown below? Are you going faster than that speed early in the 2 seconds or later in the 2 second time interval?



a. 40 m/s; You're going faster early (bigger slope) and slower later.

20. What's the displacement between  $t = 0$  seconds and  $t = 3$  seconds? (a) 72.9 m, (b) +72.9 m, (c) -72.9 m? Which would be the correct choice for distance during the same time interval?

	x (meters)	t (seconds)
	0.0	0.0
	2.7	1.0
	21.6	2.0
	72.9	3.0
	172.8	4.0

a. B (displacement is a vector and requires a direction, + give direction) ; A (do not use a + sign as it would imply a direction - not done if the quantity is a scalar, like distance is);