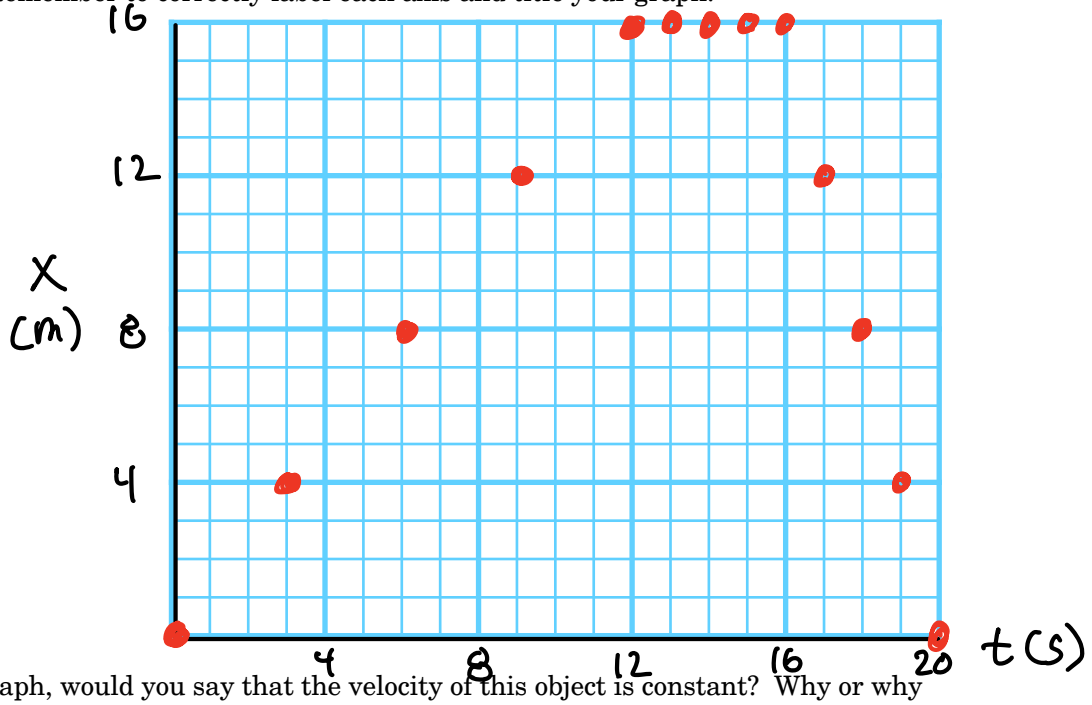
ABRHS PHYSICS (CP) NAME: _____

Position and Velocity Graphing Practice

Position versus Time

Graph the following data on the grid below and answer the problems at the bottom of the page. SHOW YOUR WORK! Remember to correctly label each axis and title your graph.

Time (s)	*Position (m)*
0	0
3	4
6	8
9	12
12	16
13	16
14	16
15	16
16	16
17	12
18	8
19	4
20	0



1. Based on your graph, would you say that the velocity of this object is constant? Why or why not?

No. There are 3 different velocities, b/c there are 3 different slopes

2. Without doing any calcultions, describe the motion in words.

went forwards 16 m in 12 sec (with a constant speed), then stood still for 5 seconds, then returned to its starting point with a different constant speed.

3. Calculate the ***average*** velocity for this motion.

0 m/s! $\bar{V} = \frac{\Delta x}{t} = \frac{0-0}{20} = 0$ m/s

4. When was the object moving the fastest? How can you tell?

From 16 to 20 seconds, b/c it was the steepest

5. Calculate the fastest speed from the motion, as well as its velocity.

It's the slope @ these ends:

$\bar{V} = \frac{\Delta x}{t} = \frac{-16}{4} = -4$ m/s So speed is 4 m/s.

6. What is the ***instantaneous*** velocity at 6 seconds?

It is the slope of the first part, so

$\bar{V} = \frac{\Delta x}{t} = \frac{16}{12} = 1.33$ m/s

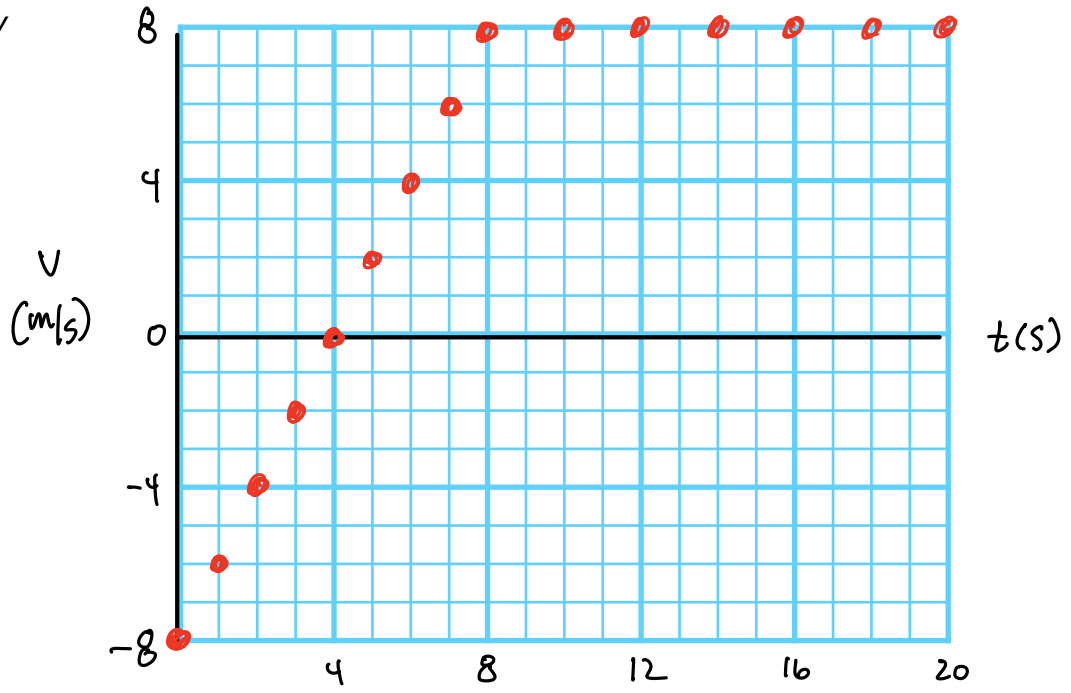
ABRHS PHYSICS (CP) NAME: _____

Position and Velocity Graphing Practice

Velocity versus Time

Plot the following data on the graph and answer the questions below. SHOW YOUR WORK. Remember to correctly label and title your graph.

Time (s)	*Velocity (m/s)*
0	–8
1	–6
2	–4
3	–2
4	0
5	2
6	4
7	6
8	8
10	8
12	8
14	8
16	8
18	8
20	8



1. According to your graph, is velocity constant? Why or why not?

   No! It was changing for the first 8 seconds. (After t=8, it was a constant velocity though.)

2. Without doing any calculations, describe the motion in words.

   Object was initially going backwards (v = -8 m/s.) It slowed down at a constant rate - momentarily stopping @ t = 4 s. It then sped up to 8 m/s - once it reached 8 m/s, it stayed @ that velocity

3. From a velocity graph, how can you determine the acceleration?

   The SLOPE!

4. There are two accelerations you can calculate. Do that please.

   From t=0 to t=8) $a = \frac{v_f - v_i}{t} = \frac{8-(-8)}{8} =$ **2 m/s²** For t>0, a = **0 m/s²**

5. What happens to the velocity every second between 0 and 8 seconds? How does that compare to the acceleration you hopefully calculated in number 4?

   It increases by 2 m/s. Hey! That's the acceleration!

6. What happens to the velocity every second between 8 and 20 seconds? How does that compare to the acceleration you hopefully calculated in number 4?

   It is constant so $a = 0\ m/s^2$

7. Was the object accelerating at t = 4 seconds? Explain your answer.

   Yes it was! The graph there is a line. At t=4 s the velocity was 0 m/s and the acceleration was 2 m/s².