

# 6.4 Graph Practice

Sunday, January 22, 2017 6:29 PM

6.4 Extra Graph Practice

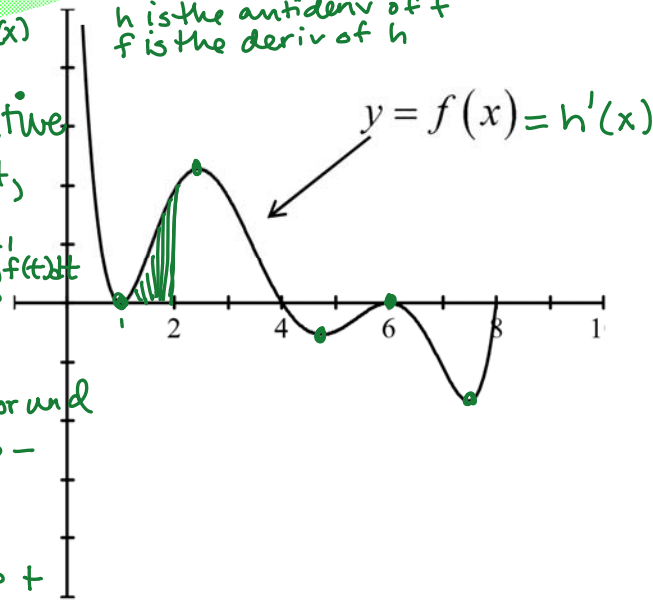
Name \_\_\_\_\_

1. Let  $h$  be the continuous function defined by  $h(x) = \int_0^x f(t) dt$ . The graph of  $f(x)$  is given below.

$h'(x) = f(x)$   
(FTC)

$h$  is the antideriv of  $f$   
 $f$  is the deriv of  $h$

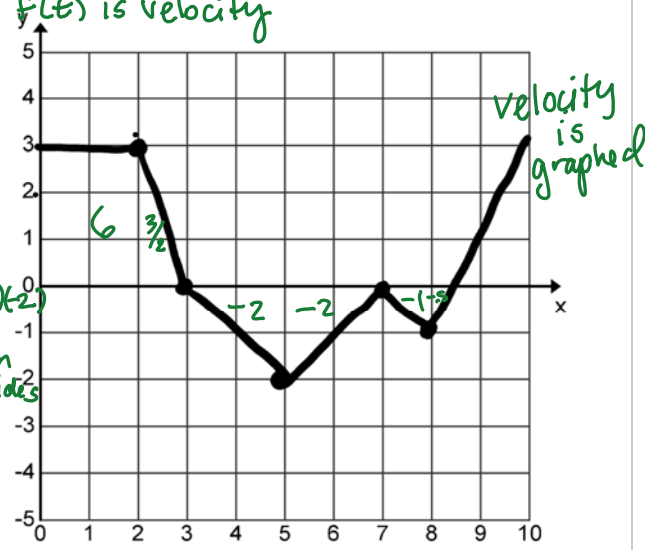
- a) Find  $h(1) = \int_0^1 f(t) dt \neq 0$
- b) Is  $h(2)$  positive or negative?  $= \int_0^2 f(t) dt = \text{positive}$   
Justify your answer. moving left to right, and above x-axis.
- c) Is  $h(0)$  positive or negative?  $= \int_0^0 f(t) dt = -\int_0^0 f(t) dt$   
Justify your answer. above x-axis
- d) Find any  $x$  values where  $h(x)$  has a relative max. Justify your answer.  
 $h'(x) = f(x) = 0$  or und  
rel. max where  $f(x)$  changes from + to -  
 $x = 4$
- e) Find any  $x$  values where  $h(x)$  has a relative min. Justify your answer.  
where  $f(x) = h'(x)$  changes from - to +  
none
- f) Find all  $x$  values of inflection points of  $h(x)$   
max/min of  $f(x) = h'(x)$   
 $h''(x) = f'(x) = 0$  or und and changes signs  
 $x \approx 1, 2.5, 4.76, 6, 7.3$



2. Let  $s = \int_0^t f(x) dx$  be the position of a particle moving along a coordinate axis. The graph of  $f(t)$  is given.

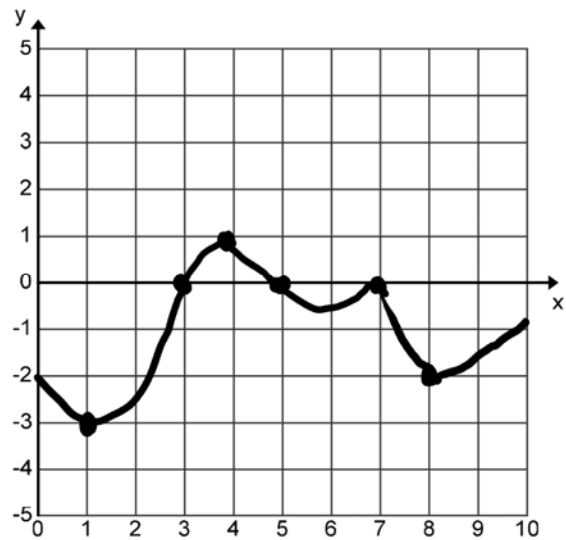
$s' = f(t)$   $s$  is position so  $f(t)$  is velocity

- a) What is the particle's velocity at  $t = 2$ ? At  $t = 6$ ?  
 $f(2) = 3$   $f(6) = -1$
- b) Is the acceleration at  $t = 2$  positive or negative? Justify your answer.  
 $a = f'$   
undefined at  $t = 2$
- c) What is the particle's position at  $t = 0$ ?  $t = 2$ ?  $t = 5$ ?  
area under  $f$   
 $s(0) = 0$   $s(2) = 2(3) = 6$   $s(5) = 6 + \frac{1}{2}(1)(3) + \frac{1}{2}(2)(-2)$
- d) At what time does  $s$  have its largest value?  $= 5.5$   
Justify your answer. at  $t = 3$   $f = s'$  changes from pos to neg so  $s$  has a max, and is only max besides  $t = 10$  (not as much area accumulated at 10)
- e) When is the particle moving towards the origin? Away?  
Away:  $(0, 3)$   $(8.5, 10)$  Towards  $(3, 8.5)$
- f) Find all  $t$  values of critical points of  $s(t)$   
 $t = 3, 7, 8.5$
- g) Find all  $t$  values of inflection points of  $s(t)$ .  
 $t = 5, 7, 8$



3. Let  $h$  be the continuous function defined by  $h(x) = \int_0^x f(t) dt$ . The graph of  $f(x)$  is given below.

- Find  $f(1)$ ,  $f(4)$
- Is  $h(2)$  positive or negative?  
Justify your answer.
- Is  $h(5)$  positive or negative?  
Justify your answer.
- Find any  $x$  values where  $h(x)$  has a relative max. Justify your answer.
- Find any  $x$  values where  $h(x)$  has a relative min. Justify your answer.
- Find all  $x$  values of inflection points of  $h(x)$



4. Let  $s = \int_0^t f(x) dx$  be the position of a particle moving along a coordinate axis. The graph of  $f(t)$  is given.

- What is the particle's velocity at  $t = 0$ ? At  $t = 4$ ?
- Is the acceleration at  $t = 6.5$  positive or negative?  
Justify your answer.
- What is the particle's position at  $t = 0$ ?  $t = 2$ ?  $t = 6$ ?
- At what time does  $s$  have its largest value?  
Justify your answer.
- When is the particle moving towards the origin? Away?
- Find all  $t$  values of critical points of  $s(t)$
- Find all  $t$  values of inflection points of  $s(t)$ .

