

AP Calculus  
5.3 Worksheet

All work must be shown in this course for full credit. Unsupported answers may receive NO credit.

1. The graph of  $f$  shown below consists of line segments and a semicircle. Evaluate each definite integral.

a)  $\int_0^2 f(x) dx$

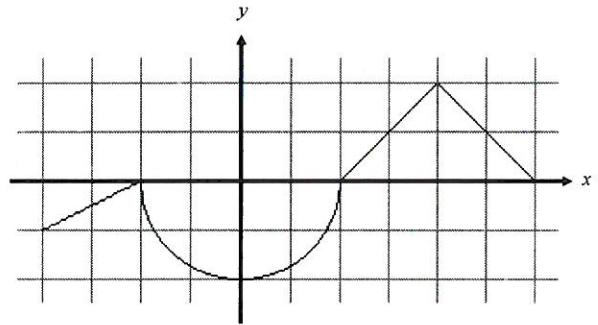
b)  $\int_2^6 f(x) dx$

c)  $\int_{-4}^2 f(x) dx$

d)  $\int_{-4}^6 f(x) dx$

e)  $\int_{-4}^6 |f(x)| dx$

f)  $\int_{-4}^6 [f(x) + 2] dx$



2. Part e above, gives a way to find the total area between the  $x$ -axis and the function between  $x = -4$  and  $x = 6$ . Without using absolute value signs, write two different expressions that can be used to find the total area between the  $x$ -axis and the function between  $x = -4$  and  $x = 6$ .

3. Suppose that  $f$  and  $g$  are continuous and  $\int_1^2 f(x) dx = -4$ ,  $\int_1^5 f(x) dx = 6$ , and  $\int_1^5 g(x) dx = 8$ .

Find each of the following:

a)  $\int_2^5 g(x) dx$

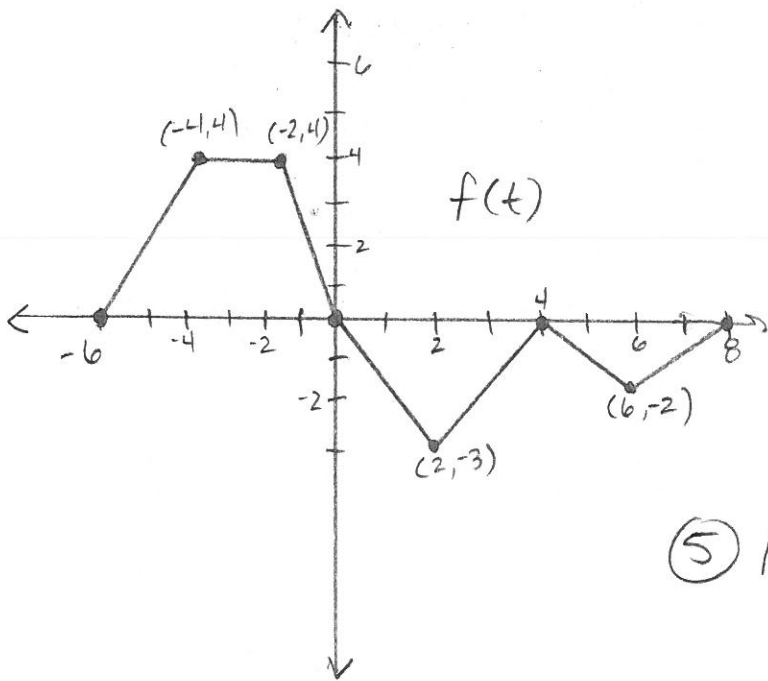
b)  $\int_5^1 g(x) dx$

c)  $\int_1^2 3f(x) dx$

d)  $\int_2^5 f(x) dx$

e)  $\int_1^5 [f(x) - g(x)] dx$

f)  $\int_1^5 [f(x) + 4] dx$



Given  $g(x) = \int_4^x f(t) dt$  on  $[-6, 8]$

Determine the following:

①  $g(0) =$       ②  $g(8) =$

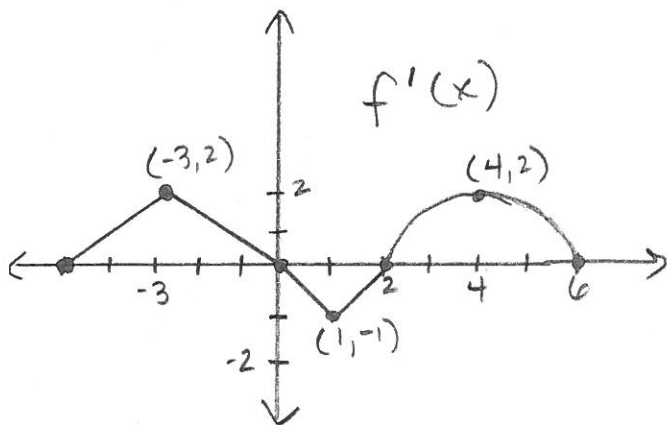
③  $g'(2) =$       ④  $g''(1) =$

⑤ Intervals where  $g(x)$  increasing?

$g(x)$  decreasing?

$g(x)$  concave up?  
down?

⑥ Abs max value on  $[-6, 8]$ ?  
of  $g(x)$   
Abs min value on  $[-6, 8]$ ?  
of  $g(x)$



$f'(x)$  is semicircle on  $[2, 6]$

Given  $f(2) = 4$

① Where is  $f(x)$  increasing?

②  $f(x)$  decreasing?

③ Determine  $f(0)$ :

$f(-5)$ :

④  $\int_{-5}^6 f'(x) dx =$

⑤  $\int_{-5}^6 2f'(x) - 8 dx =$

⑥  $\int_{-5}^6 |f'(x)| dx =$