

AP Calculus  
Day 79 Warm Up

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Evaluate to three decimal places:

$$\int_0^{\pi/3} \frac{\cos 2x}{(1 + \sin 2x)^2} dx$$

- a) 0.116      b) 0.232      c) 0.464  
d) 0.289      e) 0.341

2. Apply the chain rule to the Fundamental Theorem of Calculus:

$$\frac{d}{dx} \int_a^b f(t) dt = f(x)$$

to determine  $\frac{d}{dx} \int_{-2}^{x^4} (t - 5) dt$ .

- a)  $x - 5$                       b)  $4x^3(x^4 - 5)$   
c)  $4t^3(t^4 - 5)$               d)  $-112$   
e)  $4t - 20$

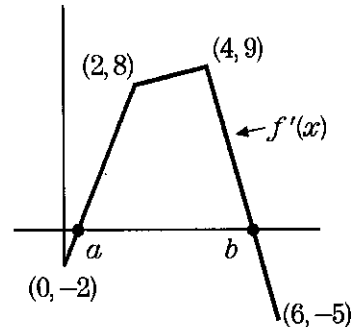
3. Let  $F(x) = \int_{x^2-1}^0 f(t) dt$  and  $f(8) = -4$ .

Find  $F'(3)$  by using the Fundamental Theorem of Calculus:

$$\frac{d}{dx} \int_a^b f(t) dt = f(x)$$

- a) 24      b) -24      c) 12      d) -12      e) 32

4. Given the graph of  $f'$ :



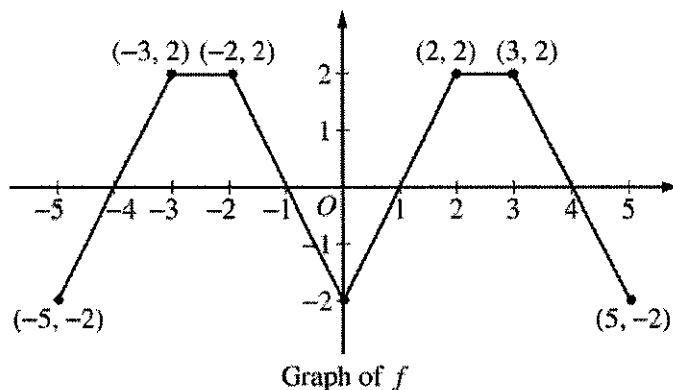
From the graph it follows that  $f$  is concave up on

- a)  $(b, 6)$                       b)  $(0, a)$                       c)  $(4, 6)$   
d)  $(2, 4)$                       e)  $(0, 4)$

5. Find the function,  $y = f(x)$ , if  $y' = 2x + 1$  and  $f(1) = 1$ .

- a)  $\frac{1}{2}x^2 + x + \frac{3}{2}$                       b)  $x^2 + x - 1$   
c)  $x^2 + x + 2$                       d)  $x^2 - 2x + 3$   
e)  $2x^2 + x - 1$

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3. The graph of the function  $f$  shown above consists of six line segments. Let  $g$  be the function given by  $g(x) = \int_0^x f(t) dt$ .
- (a) Find  $g(4)$ ,  $g'(4)$ , and  $g''(4)$ .
- (b) Does  $g$  have a relative minimum, a relative maximum, or neither at  $x = 1$ ? Justify your answer.
- (c) Suppose that  $f$  is defined for all real numbers  $x$  and is periodic with a period of length 5. The graph above shows two periods of  $f$ . Given that  $g(5) = 2$ , find  $g(10)$  and write an equation for the line tangent to the graph of  $g$  at  $x = 108$ .
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**WRITE ALL WORK IN THE PINK EXAM BOOKLET.**

**END OF PART A OF SECTION II**