9.1 The 2nd Fundamental Theorem of Calculus
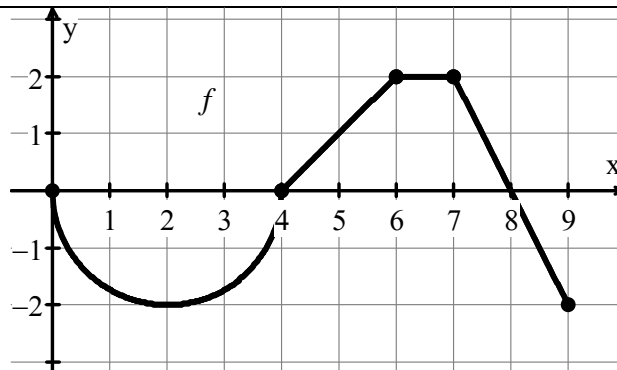
Calculus   Name: _____

Find $F'(x)$.

1. $F(x) = \int_4^x \frac{1}{\sqrt{t}}\, dt$

2. $F(x) = \int_x^3 t^2\, dt$

3. $F(x) = \int_\pi^x \tan t\, dt$

4. $F(x) = \int_x^5 \frac{1}{t}\, dt$

5. $F(x) = \int_{-1}^{2x}(1 - t^2)\, dt$

6. $F(x) = \int_e^{e^x} \ln t\, dt$

7. $F(x) = \int_9^{x^4} \sqrt{t}\, dt$

8. $F(x) = \int_0^{x^2 - x} t^2\, dt$

9. $F(x) = \int_{-\pi}^{\cos x} 2^t\, dt$

10. $F(x) = \int_{-x}^x \sin^2 t\, dt$

11. $F(x) = \int_{-x}^{3x^2} t^2\, dt$

12. $F(x) = \int_{x^2}^{x^4} \sqrt{t}\, dt$

13. Use the function f in the figure and the function g defined by $g(x) = \int_0^x f(t)\, dt$ to answer the following questions.
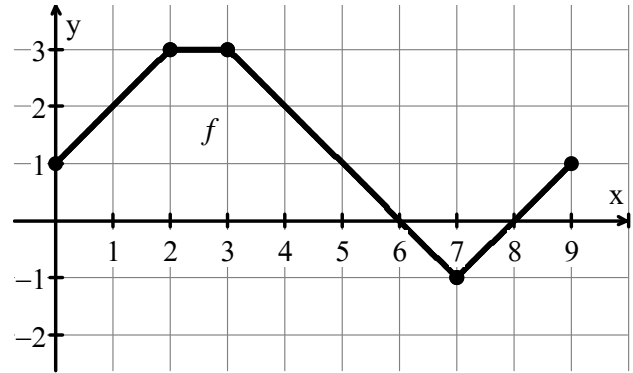
   a) Find $g(6)$?

   b) At what x-values does g have a minimum?

   c) At what x-values does g have a maximum?

   d) Let h be a function defined by $h(x) = \frac{f(x)}{3x^2 - 1}$. Find $h'(2)$.

14. Use the function f in the figure and the function h defined by $h(x) = \int_0^x f(t)\, dt$ to answer the following questions.
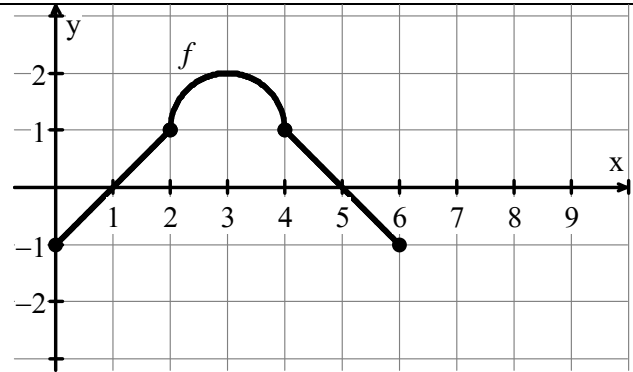
a) Find $h(3)$.

b) At what x-values does h have a minimum?

c) At what x-values does h have a maximum?

d) Let g be a function defined by $g(x) = f(x)(2 - x^2)$. Find $g'(4)$.

15. Use the function f in the figure and the function g defined by $g(x) = \int_0^x f(t)\, dt$ to answer the following questions.

a) Find $g(4)$.

b) At what x-values does g have a minimum?

c) At what x-values does g have a maximum?

d) Let h be a function defined by $h(x) = f(x^2 + 4)$. Find $h'(1)$.

Answers to 9.1 CA #1

1. $\frac{1}{\sqrt{x}}$	2. $-x^2$	3. $\tan x$	4. $-\frac{1}{x}$	5. $2 - 8x^2$	6. xe^x
7. $4x^5$	8. $2x^5 - 5x^4 + 4x^3 - x^2$	9. $-\sin x\, 2^{\cos x}$	10. $\sin^2 x + \sin^2(-x)$		11. $54x^5 + x^2$

| 12. $4x^5 - 2x^2$ | 13.
a) $2 - 2\pi$
b) $x = 4$,
$\quad x = 9$ | c) $x = 0$,
$\quad x = 8$
d) $\frac{24}{121}$ | 14.
a) 7
b) $x = 0$,
$\quad x = 8$ | c) $x = 6$,
$\quad x = 9$
d) -2 | 15.
a) $2 + \frac{\pi}{2}$
b) $x = 1$,
$\quad x = 6$ | c) $x = 0$,
$\quad x = 5$
d) -2 |