

Second Fundamental Theorem of Calculus



Complete the table below for each function.

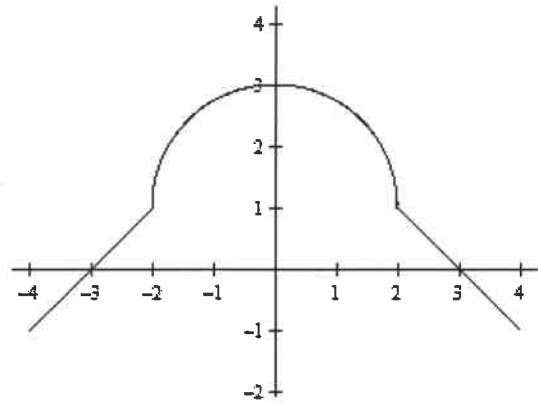
Function	$F'(x)$ from page 584	Find $F'(x)$ by applying the Second Fundamental Theorem of Calculus
$F(x) = \int_1^x (4t - t^2) dt$		$F(x) = \int_1^x (4t - t^2) dt$
$F(x) = \int_1^x (\cos t) dt$		$F(x) = \int_1^x (\cos t) dt$
$F(x) = \int_1^{x^2} t^3 dt$		$F(x) = \int_1^{x^2} t^3 dt$
$F(x) = \int_1^{x^2} 6\sqrt{t} dt$		$F(x) = \int_1^{x^2} 6\sqrt{t} dt$

Find the derivative of each of the following functions.

$F(x) = \int_{-2}^{2x} \sqrt{2-t^2} dt$	$G(x) = \int_{x^2}^{-3} e^{\cos t} dt$	$H(x) = \int_0^{\cos x} t^2 dt$
---	--	---------------------------------

Pictured to the right is the graph of $g(t)$ and the function

$f(x)$ is defined to be $f(x) = \int_{-4}^{2x} g(t) dt$.



1. Find the value of $f(0)$.

2. Find the value of $f(2)$.

3. Find the value of $f'(1)$.

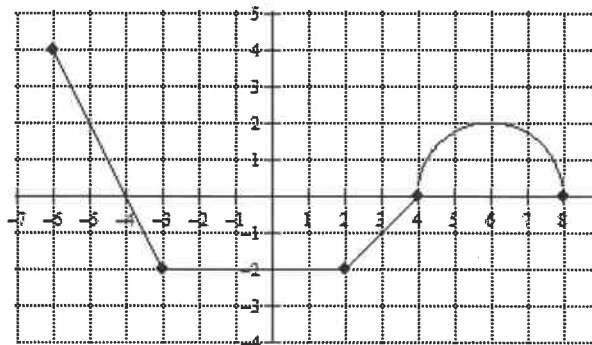
4. Find the value of $f'(-2)$.

5. Find the value of $f''(2)$.

Given to the right is the graph of $f(t)$ which consists of three line segments and one semicircle.

Additionally, let the function $g(x)$ be defined to be $g(x) = \int_{-1}^x f(t) dt$.

1. Find $g(-6)$.



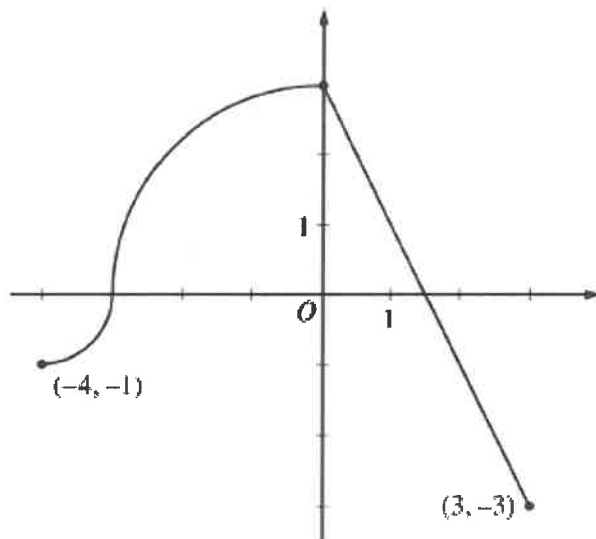
2. Find $g(6)$.

3. Find $g'(6)$.

4. Find $g'(2)$.

5. Find $g''(2)$. Give a reason for your answer.

6. Find $g''(-4)$. Give a reason for your answer.



Graph of f

The continuous function f is defined on the interval $-4 \leq x \leq 3$. The graph consists of two quarter circles and one line segment, as show in the figure above. Let $g(x) = \frac{1}{2}x^2 + \int_0^x f(t)dt$.

Find the value of $g(3)$.	Find the value of $g(-4)$.
Find the value of $g'(3)$.	Find the value of $g''(2)$.

