

Classroom Voting Questions: Calculus II

Section 6.4 Second Fundamental Theorem of Calculus

1. If $f(x) = \int_1^x t^4 dt$, then

(a) $f'(x) = t^4$

(b) $f'(x) = x^4$

(c) $f'(x) = \frac{1}{5}x^5 - \frac{1}{5}$

(d) $f'(x) = x^4 - 1$

2. If $f(t) = \int_t^7 \cos x dx$, then

(a) $f'(t) = \cos t$

(b) $f'(t) = \sin t$

(c) $f'(t) = \sin 7 - \sin t$

(d) $f'(t) = -\cos t$

(e) $f'(t) = -\sin t$

3. If $f(x) = \int_2^x e^{2x} dx$, then

(a) $f'(x) = 2xe^{2x^2}$

(b) $f'(x) = e^{2x}$

(c) $f'(x) = e^{2x^2}$

(d) $f'(x) = 2e^{2x^2}$

(e) $f'(x) = \frac{1}{2}e^{2x^2} - \frac{1}{2}e^8$

4. **True or False:** If f is continuous on the interval $[a, b]$, then $\frac{d}{dx} \int_a^b f(x) dx = f(x)$.

5. If f is continuous on the interval $[a, b]$, then $\frac{d}{dx} \int_a^b f(x) dx =$

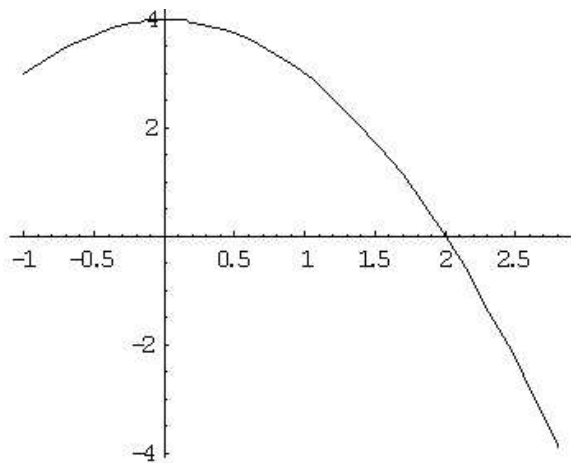
(a) 0

(b) $f(b)$

- (c) $f(x)$
- (d) None of the above.

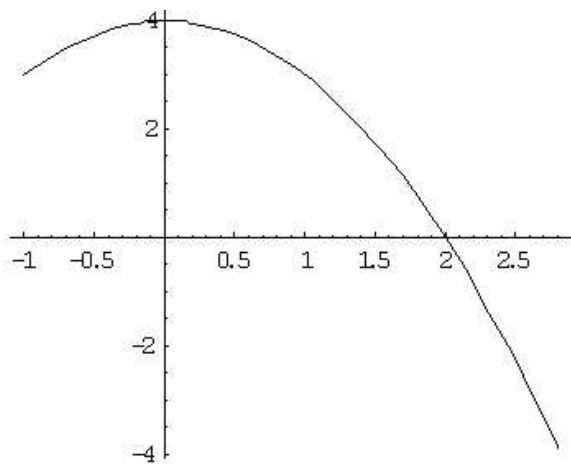
6. **True or False:** $\int_0^x \sin(t^2)dt$ is an antiderivative of $\sin(x^2)$.

7. The graph of function f is given below. Let $g(x) = \int_0^x f(t)dt$. Then for $0 < x < 2$, $g(x)$ is



- (a) increasing and concave up.
- (b) increasing and concave down.
- (c) decreasing and concave up.
- (d) decreasing and concave down.

8. The graph of function f is given below. Let $g(x) = \int_0^x f(t)dt$. Then



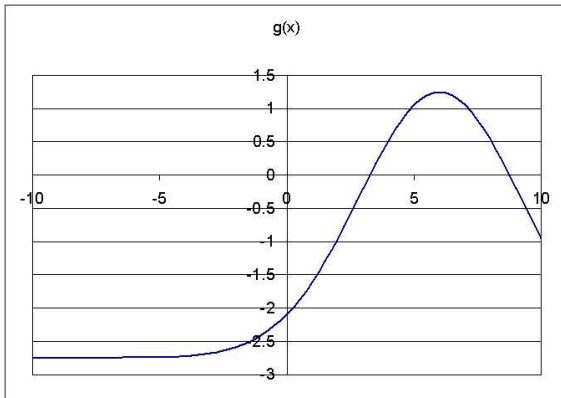
- (a) $g(0) = 0$, $g'(0) = 0$ and $g'(2) = 0$

- (b) $g(0) = 0$, $g'(0) = 4$ and $g'(2) = 0$
- (c) $g(0) = 1$, $g'(0) = 0$ and $g'(2) = 1$
- (d) $g(0) = 0$, $g'(0) = 0$ and $g'(2) = 1$

9. The speed of a car is given by the function $s(t) = 15t^2$, where t is in seconds, and s is in feet per second. If the car starts out a distance of 20 ft from the starting line, how far from the starting line will the car be at $t = 4$ seconds?

- (a) 240 ft
- (b) 260 ft
- (c) 320 ft
- (d) 340 ft
- (e) 6,000 ft

10. The function $g(x)$ is related to the function $f(x)$ by the equation $g(x) = \int_3^x f(x)dx$, and $g(x)$ is plotted below. Where is $f(x)$ positive?



- (a) $3 < x < 8$
- (b) $x < 6$
- (c) $2.5 < x$
- (d) $x < 2.5$