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 $f(x) = \int_2^{x^2} e^{2t} dt$, 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. If $f(x) = \int_3^x \cos\left(e^{\sin t}\right)\, dt$, what is $f'(x)$?

   (a) $f'(x) = \cos\left(e^{\sin x}\right) - \cos\left(e^{\sin 3}\right)$
   (b) $f'(x) = \sin\left(e^{\sin x}\right)$
   (c) $f'(x) = \cos\left(e^{\sin x}\right)$
   (d) $f'(x) = \cos\left(e^{\sin t}\right)$

(e) None of the above

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

   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

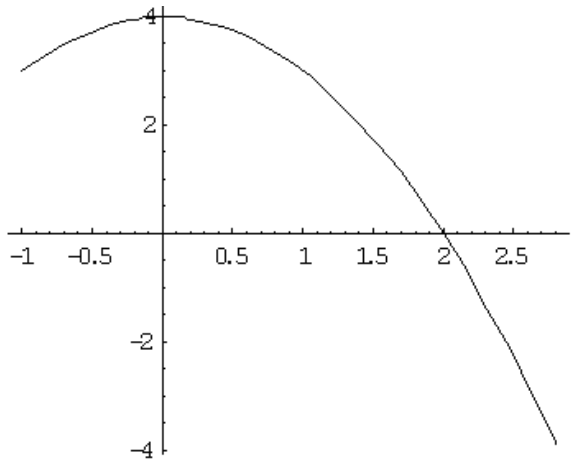
6. If f is continuous on the interval $[a, b]$, then $\frac{d}{dx}\int_a^b f(x)dx =$

   (a) 0
   (b) $f(b)$
   (c) $f(x)$
   (d) None of the above.

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

   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

8. 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



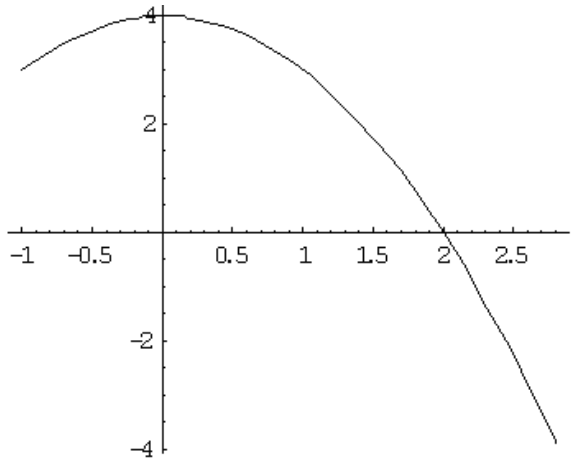
(a) increasing and concave up.

(b) increasing and concave down.

(c) decreasing and concave up.

(d) decreasing and concave down.

9. 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 $g'(2) = 1$

10. 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

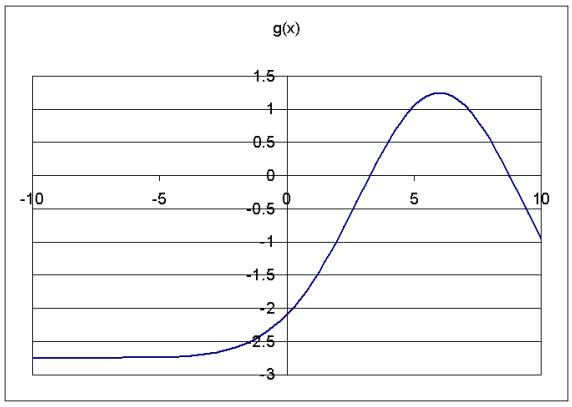
(b) 260 ft

(c) 320 ft

(d) 340 ft

(e) 6,000 ft

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



(a) $3 < x < 8$

(b) $x < 6$

(c) $2.5 < x$

(d) $x < 2.5$