DATE: _____

2nd Fundamental Theorem of Calculus: Multiple-Choice Practice

1. $\frac{d}{dx}\int_{-17}^{x} t\cos\left(t^2\right)\,dt =$

(A) $\frac{1}{2}\sin x^2 - \frac{1}{2}\sin\left(-17^2\right)$

(B) $x\cos(x^2) - (-17)\cos(-17^2)$

(C) $\frac{1}{2}\sin x^2$

(D) $x\cos(x^2)$

(E) None of the above

2. If $F(x) = \int_{\pi}^{x} e^{2t}\sin^2(3t)\,dt$, then $F'(x) =$

(A) $e^{2x}\sin^2(3x)$

(B) $\int_{\pi}^{x} e^{2t}\sin^2(3t)\,dt - \int_{\pi}^{x} e^{2\pi}\sin^2(3\pi)\,dt$

(C) $e^{2\pi}\sin^2(3x)$

(D) 0

(E) None of the above

3. $\frac{d}{dx}\int_{-3}^{1}\left(2t^3+3\right)dt =$

(A) $2t^3+3$

(B) 56

(C) 5

(D) -28

(E) 0

4. If $F(x) = \int_{7}^{x} t^2\sin(t)\,dt$, then $F'\left(\frac{5\pi}{2}\right) =$

(A) 0

(B) 29.493

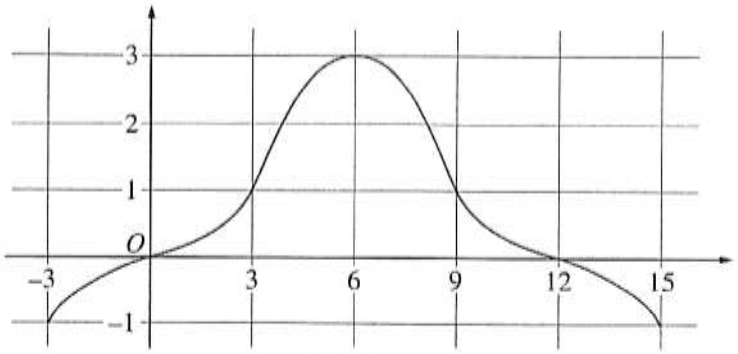
(C) 61.685

(D) $x^2\sin(x)$

(E) None of the above

2nd Fundamental Theorem of Calculus: Free-Response Practice

No calculator is allowed for these problems.



Graph of f

4. The graph of a differentiable function f on the closed interval $[-3, 15]$ is shown in the figure above. The graph of f has a horizontal tangent line at $x = 6$. Let $g(x) = 5 + \int_6^x f(t)dt$ for $-3 \le x \le 15$.

   (a) Find $g(6)$, $g'(6)$, and $g''(6)$.

   (b) On what intervals is g decreasing? Justify your answer.

   (c) On what intervals is the graph of g concave down? Justify your answer.