Unit 6 - Review

Score: _____/ 33 Name:_____

If $\int_4^{-10} g(x)\,dx = -3$ and $\int_4^6 g(x)\,dx = 5$, find $\int_{-10}^6 g(x)\,dx =$

| $x$ | 0 | 5 |
|---|---|---|
| $f(x)$ | 3 | $-2$ |
| $g(x)$ | 0 | 2 |
| $g'(x)$ | 1 | $-3$ |

Let $f$ be the function given by $f(x) = \int_{-1}^x g(t)\,dt$ where $g$ is a differentiable function. The table above gives selected values of $f$, $g$, and $g'$. If $h$ is the function given by $h(x) = x^2 - e^x + 1$ for which of the following values of $x$ is $h(x) = f'(5)$?

(A) $-2.032$ (B) $-1.147$ (C) 0 (D) 1.873 (E) 2.158

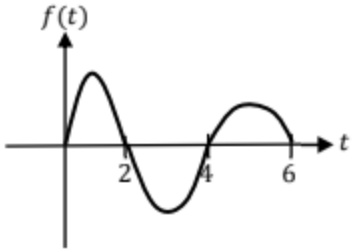
Suppose $g(x)$ is a continuous function. A table of selected values of $g(x)$ is shown below.

| $x$ | 0 | 3 | 6 | 9 | 12 | 15 | 18 |
|---|---|---|---|---|---|---|---|
| $g(x)$ | $-4$ | $-2$ | 3 | 4 | 9 | 5 | 1 |

The approximate value of $\int_0^{18} g(x)dx$ using a midpoint Riemann sum with three subintervals of equal length is

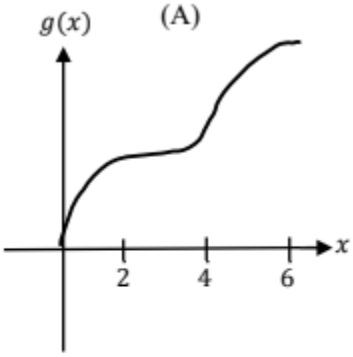
(A) 48 (B) 42 (C) 39 (D) 24 (E) 21

Let $g(x) = \int_0^x f(t)\,dt$, where $f(t)$ has the graph shown below.

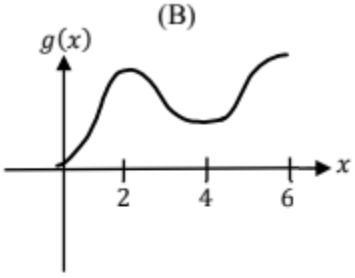



Which of the following could be the graph of $g$?

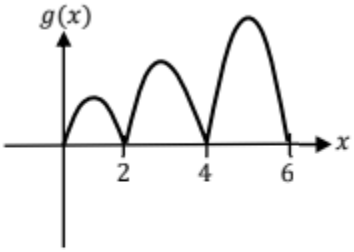
(A)



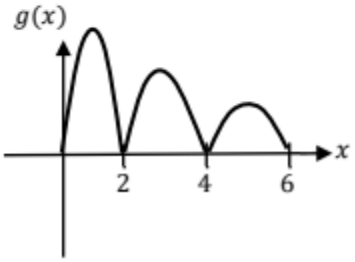

(B)



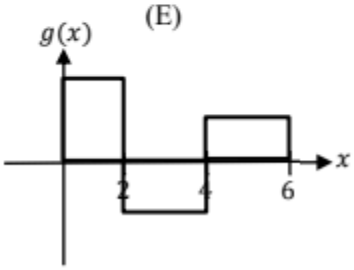

(C)




(D)




(E)

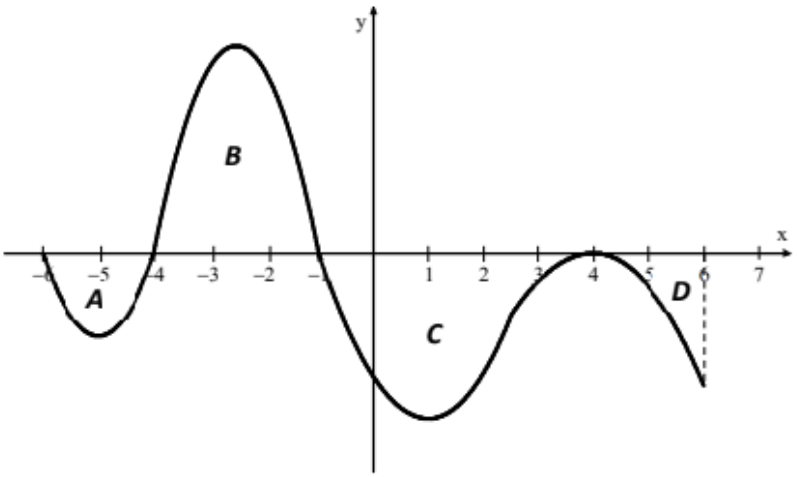



**Find the following indefinite integrals.**

$\int \sin x\, e^{\cos x}\, dx$

$\int xe^{x^2} dx$

$\int \frac{1}{\sqrt{-x^2-8x-15}} dx$




The figure above shows the graph of the continuous function $f$. The regions A, B, C, and D have areas 4, 13, 16, and 3, respectively. For $-6 \le x \le 6$, the function $g$ is defined by $g(x) = 4 + \int_{-1}^{x} f(t)\,dt$.

(a) Is there a value $x$, for $-1 \le x \le 4$, such that $g(x) = 0$? Justify your answer.

(b) Find the absolute minimum value of $g$ on the interval $-6 \le x \le 6$.

(c) Find the value of $\int_{1}^{-1} f(5-x)\,dx$

**Find the value of the definite integral.**

$\int_{0}^{\frac{\pi}{6}} \sin(3x)\cos(3x)\,dx$

$\int_{0}^{4} \frac{2}{\sqrt{2x+1}}dx$

$\int_{0}^{\ln 3} e^{x}(4-e^{x})dx$

A curve given by the equation $x^3 + xy = 8$ has slope given by $\frac{dy}{dx} = \frac{-3x^2-y}{x}$. The value of $\frac{d^2y}{dx^2}$ at the point where $x = 2$ is

(A) $-6$ (B) $-3$ (C) 0 (D) 4 (E) undefined