

Questions on 6.5 HW?

(12) mult. by $\frac{1}{3600}$ to get sec. into hrs.

$$T = \frac{1}{3600} \left(\frac{1}{2} \right) (0 + 2(3) + 2(7) + 2(12) + 2(17) + 2(25) + 2(33) + 2(41) + 48) = 0.045 \text{ mi}$$

$$\rightarrow 0.045 (5280) = 238 \text{ ft.}$$

AP CALCULUS AB
Unit 6 Review
Definite Integrals

No calculator may be used on the following problems.

1. The average value of $f(x) = \frac{1}{x}$ from $x = 1$ to $x = e$ is

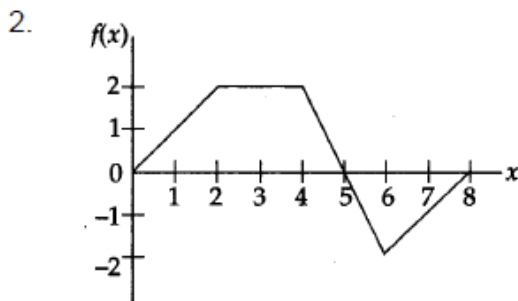
(A) $\frac{1}{e+1}$

(B) $\frac{1}{1-e}$

(C) $e-1$

(D) $1 - \frac{1}{e^2}$

(E) $\frac{1}{e-1}$



The graph of a piecewise linear function f , for $0 \leq x \leq 8$, is shown above. What is the value of $\int_0^8 f(x) dx$?

(A) 1

(B) 4

(C) 8

(D) 10

(E) 13

3. $\int_2^3 \frac{1}{x^3} dx =$

(A) $-\frac{5}{72}$

(B) $-\frac{5}{36}$

(C) $\frac{5}{144}$

(D) $\frac{5}{72}$

(E) $\ln \frac{27}{8}$

4. If f is continuous for $a \leq x \leq b$, then at any point $x = c$, where $a < c < b$, which of the following must be true?

(A) $f(c) = \frac{f(b) - f(a)}{b - a}$

(B) $f(a) = f(b)$

(C) $f(c) = 0$

(D) $\int_a^b f(x) dx = f(c)$

(E) $\lim_{x \rightarrow c} f(x) = f(c)$

5. The average value of $\sec^2 x$ on the interval $\left[\frac{\pi}{6}, \frac{\pi}{4}\right]$ is

(A) $\frac{8}{\pi}$

(B) $\frac{12\sqrt{3} - 12}{\pi}$

(C) $\frac{12 - 4\sqrt{3}}{\pi}$

(D) $\frac{6\sqrt{2} - 6}{\pi}$

(E) $\frac{6 - 6\sqrt{2}}{\pi}$

A graphing calculator may be used for the following problems.

6. What is the trapezoidal approximation of $\int_0^3 e^x dx$ using $n = 4$ subintervals?

(A) 6.407

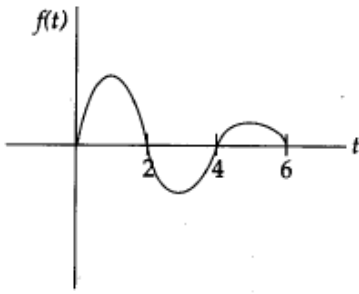
(B) 13.565

(C) 19.972

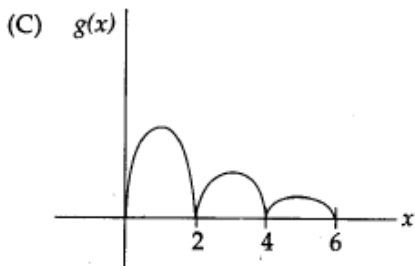
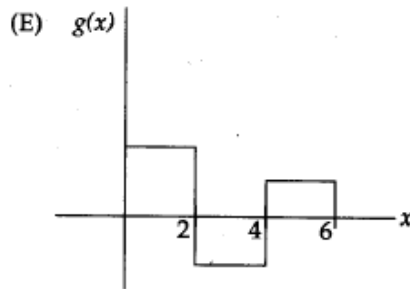
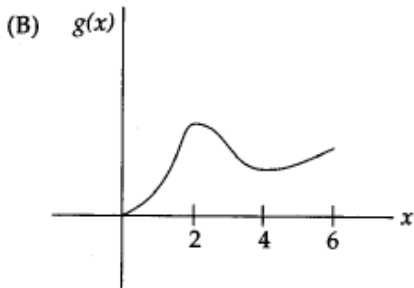
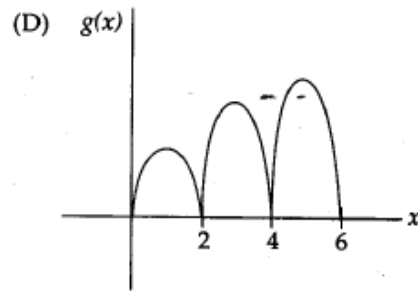
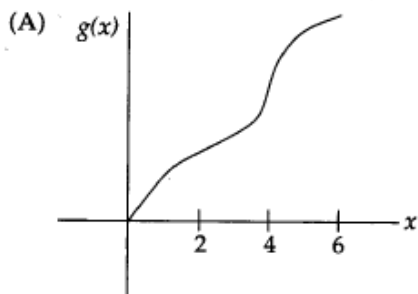
(D) 27.879

(E) 34.944

7.



Let $g(x) = \int_0^x f(t) dt$, where $f(t)$ has the graph shown above. Which of the following could be the graph of g ?



8. $\frac{d}{dx} \int_0^{x^2} \sin^2 t \, dt =$

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

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

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

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

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

9. Find the value(s) of $\frac{dy}{dx}$ of $x^2y + y^2 = 5$ at $y = 1$.

(A) $-\frac{3}{2}$ only

(B) $-\frac{2}{3}$ only

(C) $\frac{2}{3}$ only

(D) $\pm\frac{2}{3}$

(E) $\pm\frac{3}{2}$

10. Approximate $\int_0^1 \sin^2 x \, dx$ using the Trapezoid Rule with $n = 4$, to three decimal places.

(A) 0.277

(B) 0.273

(C) 0.555

(D) 1.109

(E) 2.219

11.

t (days)	$W(t)$ (°C)
0	20
3	31
6	28
9	24
12	22
15	21

The temperature, in degrees Celsius (°C), of the water in a pond is a differentiable function W of time t . The table above shows the water temperature as recorded every 3 days over a 15-day period.

- Use data from the table to find an approximation for $W'(12)$. Show the computations that lead to your answer. Indicate units of measure.
- Approximate the average temperature, in degrees Celsius, of the water over the time interval $0 \leq t \leq 15$ days by using a trapezoidal approximation with subintervals of length $\Delta t = 3$ days.
- A student proposes the function P , given by $P(t) = 20 + 10te^{(-t/3)}$, as a model for the temperature of the water in the pond at time t , where t is measured in days and $P(t)$ is measured in degrees Celsius. Find $P'(12)$. Using appropriate units, explain the meaning of your answer in terms of water temperature.
- Use the function P defined in part (c) to find the average value, in degrees Celsius, of $P(t)$ over the time interval $0 \leq t \leq 15$ days.

Homework

Unit 6 Review