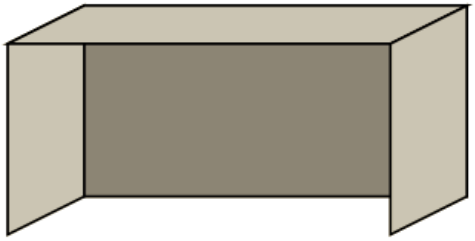
AB review 08 Not consumable #_____

Optimization Show all work. Calculator permitted. Show all set-ups and analysis. Report all answers to 3 decimals and avoid intermediate rounding error.

Multiple Choice

1. An advertisement is run to stimulate the sale of cars. After t days, $1 \le t \le 48$, the number of cars sold is given by $N(t) = 4000 + 45t^2 - t^3$. On what day does the maximum rate of growth sales occur?

(A) on day 17 (B) on day 13 (C) on day 15 (D) on day 16 (E) on day 14



2. A canvas wind shelter like the one above is to be built for use along parts of the American River. It is to have a back, two square sides, and a top. If $\frac{147}{2}$ square feet of canvas is to be used in the construction, find the depth of the shelter for which the space inside is maximized assuming all the canvas is used.

(A) depth =72 feet (B) depth =7 4 feet (C) depth = 4 feet (D) depth = 7 feet (E) none of these

5. A point moves on the x-axis in such a way that its velocity at time t (t > 0) is given by $v(t) = \frac{\ln t}{t}$. At what value of t does v attain its maximum?

(A) 1 (B) e (C) e (D) 3e (E) There is no maximum value for v.

6. The derivative of $f(x) = \frac{x^4}{3} - \frac{x^5}{5}$ attains its maximum value at x =

(A) −1 (B) 0 (C) 1 (D) $\frac{4}{3}$ (E) $\frac{5}{3}$

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Multiple Choice

7. (Calculator Permitted) If the midpoints of 4 equal-width rectangles is used to approximate the area enclosed between the x-axis and the graph of $y = 4x - x^2$, the approximation is

(A) 10 (B) 10.5 (C) 10.666 (D) 10.75 (E) 11

8. If $\int_2^5 f(x)dx = 18$, then $\int_2^5 \big(f(x) + 4 \big) dx =$

(A) 20 (B) 22 (C) 23 (D) 25 (E) 30

9. $\int_{-4}^{4} \big(4 - |x| \big) dx =$

(A) 0 (B) 4 (C) 8 (D) 16 (E) 32

10. If $\int_a^b f(x)dx = a + 2b$, then $\int_a^b \big(f(x) + 3 \big) dx =$

(A) a+2b+3 (B) 3b-3a (C) 4a-b (D) 5b-2a (E) 5b-3a

11. The expression $\frac{1}{20}\left(\sqrt{\frac{1}{20}} + \sqrt{\frac{2}{20}} + \sqrt{\frac{3}{20}} + K + \sqrt{\frac{20}{20}} \right)$ is a Riemann sum approximation for

$A) \int_0^1 \sqrt{\frac{x}{20}} dx$ $B) \int_0^1 \sqrt{x} dx$ $C) \frac{1}{20} \int_0^1 \sqrt{\frac{x}{20}} dx$ $D) \frac{1}{20} \int_0^1 \sqrt{x} dx$ $E) \frac{1}{20} \int_0^{20} \sqrt{x} dx$

12. If $f(x)$ is represented by the table below, approximate $\int_1^{9.6} f(x)dx$

Use as many subintervals as the data allows:

x	1	2.5	4	6	8	8.8	9.6
$f(x)$	4	3	2	3	5	6	4

a) left end point Riemann sum

b) right end pt Riemann sum

c) midpoint

d) trapezoid