

CALCULUS I - Worksheet #57

1. Approximate the area under the curve $y = x^2$ from $x = 0$ to $x = 3$ using
- 3 left-endpoint (inscribed) rectangles
 - 3 right-endpoint (circumscribed) rectangles
 - 3 midpoint rectangles
 - 3 trapezoids
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2. The maximum value of the function $f(x) = x^4 - 4x^3 + 6$ on the closed interval $[1, 4]$ is
- A) 1 B) 0 C) 3 D) 6 E) none of these
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3. The curve of $y = \frac{1-x}{x-3}$ is concave up when
- A) $x > 3$ B) $1 < x < 3$ C) $x > 1$ D) $x < 1$ E) $x < 3$
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4. The equation of the tangent to the curve of $y = x^2 - 4x$ at the point where the curve crosses the y -axis is
- A) $y = 8x - 4$ B) $y = -4x$ C) $y = -4$ D) $y = 4x$ E) $y = 4x - 8$
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5. The derivative of a function f is given for all x by $f'(x) = x^2(x+1)^3(x-4)^2$.
The set of x for which f is a relative maximum is:
- A) $\{0, -1, 4\}$ B) $\{-1\}$ C) $\{0, 4\}$ D) $\{1\}$ E) none of these
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6. A rectangle of perimeter 18 in. is rotated about one of its sides to generate a right circular cylinder. The rectangle which generates the cylinder of largest volume has area, in square inches, of
- A) 14 B) 20 C) $\frac{81}{4}$ D) 18 E) $\frac{77}{4}$
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7. If the radius r of a sphere is increasing at a constant rate, then the rate of increase of the volume of the sphere is:
- A) constant B) increasing C) decreasing
D) increasing for $r < 1$ and decreasing for $r > 1$
E) decreasing for $r < 1$ and increasing for $r > 1$
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8. $\int_0^1 \frac{e^x}{(3-e^x)^2} dx$ equal
- A) $3 \ln(e-3)$ B) 1 C) $\frac{1}{3-e}$ D) $\frac{e-2}{3-e}$ E) none
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9. (Free Response) Let R be the region enclosed by the graphs of $y = 2 \ln x$ and $y = \frac{x}{2}$, and the lines $x = 2$ and $x = 8$.
- Find the area of R .
 - Set up, but do not integrate an integral expression, in terms of a single variable, for the volume of the solid generated when R is revolved about the x -axis.
 - Set up, but do not integrate an integral expression, in terms of a single variable, for the volume of the solid generated when R is revolved about the line $x = -1$.
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