

Worksheet #37

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1. Approximate to 3 decimal places the integral  $\int_0^4 \sqrt{x} dx$  with 4 equal intervals using:

- a) rectangles whose height is the right-hand endpoint
  - b) rectangles whose height is the left-hand endpoint
  - c) rectangles whose height is the midpoint of the interval
  - d) trapezoids (trapezoidal rule)
  - e) Evaluate the integral directly.
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2. The solution set of  $\frac{7}{x^2 + 8x + 23} = 1$  is A) {8,4} B) {8, -4} C) {-4, -4} D) {4, -4} E) {16,1}

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3. Given the equation  $\frac{7x}{3} = (a^4 + 1)^3$ , and  $a = -1$ , solve for x. A) 16 B)  $\frac{24}{7}$  C) 24 D)  $\frac{20}{3}$  E) 0

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4. Approximate the area under  $y = (x + 1)^2$  on  $[0, 4]$  using  
(a) 4 rectangles whose height is given using the left endpoint,  
(b) 4 rectangles whose height is given using the right endpoint,  
(c) 4 rectangles whose height is given using the midpoint, and  
(d) 4 trapezoids. (e) Evaluate the integral directly.

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5. If  $\frac{f(x_1)}{f(x_2)} = f\left(\frac{x_1}{x_2}\right)$  for all real numbers  $x_1$  and  $x_2$ , where  $x_2 \neq 0$  and  $f(x_2) \neq 0$ , which of the following could define f? A)  $f(x) = \frac{1}{x}$  B)  $f(x) = x^2 + 3$  C)  $f(x) = x + 1$  D)  $f(x) = \ln x$  E)  $f(x) = e^x$

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6.  $\lim_{x \rightarrow 4} \frac{x^3 - 4x^2 - x + 4}{x - 4} =$

7.  $\int \sin(4x + 2) dx =$

8.  $\int \sin^5 x dx =$

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9. Find c for Rolle's Theorem if  $f(x) = x^2 - 2x - 3$  on  $[-1, 3]$ .

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10. Find c for the Mean Value Theorem if  $f(x) = 2x^2 + 1$  in  $[1, 3]$ .

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11. If  $f(x) = x \cos \frac{1}{x}$ , then  $f' \left( \frac{2}{p} \right) =$  A)  $\frac{p}{2}$  B)  $-\frac{2}{p}$  C)  $-1$  D)  $-\frac{p}{2}$  E) 1

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12. Why does  $f(x) = \frac{x^2 - 4x}{x - 2}$  on  $[0, 4]$  **not** satisfy the hypotheses of Rolle's Theorem?

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**Answers:** 1. a) 6.146 b) 4.146 c) 5.384 d) 5.146 e) 5.333 2.C 3.B

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4.a) 30 b) 54 c) 41 d) 42 e)  $41 \frac{1}{3}$  5.A 6.15 7.  $-\frac{1}{4} \cos(4x + 2) + C$

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8.  $-\cos x + \frac{2}{3} \cos^3 x - \frac{1}{5} \cos^5 x + C$  9.1 10.2 11.A

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12.  $f(2)$  does not exist, therefore not continuous and  $f'(2)$  is undefined

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