AP Calculus AB
Practice Exam I

Name: ____________________
Block: __________ Date: __________

A GRAPHING CALCULATOR MAY BE REQUIRED FOR SOME PROBLEMS OR PARTS OF PROBLEMS IN THIS SECTION OF THE EXAM.

Part I: Multiple Choice. Determine which of the given choices is the best choice. Unless otherwise specified, the domain of a function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

29. $\int_0^{\pi/4} \sin x\, dx + \int_{-\pi/4}^{0} \cos x\, dx =$

A. $-\sqrt{2}$ B. -1 C. 0 D. 1 E. $\sqrt{2}$

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30. Boats A and B leave the same place at the same time. Boat A heads due north at 12 km/hr. Boat B heads due east at 18 km/hr. After 2.5 hours, how fast is the distance between the boats increasing (in km/hr)?

A. 21.63 B. 31.20 C. 75.00 D. 9.84 E. 54.08

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31. $\lim_{h \to 0} \dfrac{\tan(\frac{\pi}{6} + h) - \tan \frac{\pi}{6}}{h} =$

A. $\dfrac{\sqrt{3}}{3}$ B. $\dfrac{4}{3}$ C. $\sqrt{3}$ D. 0 E. $\dfrac{3}{4}$

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32. If $\int_{30}^{100} f(x)\, dx = A$ and $\int_{50}^{100} f(x)\, dx = B$, then $\int_{30}^{50} f(x)\, dx =$

A. $A + B$ B. $A - B$ C. 0 D. $B - A$ E. 20

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33. If $f(x) = 3x^2 - x$, and $g(x) = f^{-1}(x)$, then $g'(10)$ could be

A. 59 B. $\dfrac{1}{59}$ C. $\dfrac{1}{10}$ D. 11 E. $\dfrac{1}{11}$

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34. The graph of $y = x^3 - 5x^2 + 4x + 2$ has a local minimum at

A. $(0.46, 2.87)$ B. $(0.46, 0)$ C. $(2.87, -4.06)$ D. $(4.06, 2.87)$ E. $(1.66, -0.59)$

35. The volume generated by revolving about the y-axis the region enclosed by the graphs $y = 9 - x^2$ and $y = 9 - 3x$, for $0 \leq x \leq 2$, is

A. -8π B. 4π C. 8π D. 24π E. 48π

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36. The average value of the function $f(x) = \ln^2 x$ on the interval $[2, 4]$ is

A. -1.204 B. 1.204 C. 2.159 D. 2.408 E. 8.636

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37. $\frac{d}{dx} \int_0^{3x} \cos(t)\, dt =$

A. $\sin 3x$ B. $-3\sin 3x$ C. $\cos 3x$ D. $3\sin 3x$ E. $3\cos 3x$

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38. If the definite integral $\int_1^3 (x^2 + 1)\, dx$ is approximated by using the Trapezoid Rule with $n = 4$, the error is

A. 0 B. $\frac{7}{3}$ C. $\frac{1}{12}$ D. $\frac{65}{6}$ E. $\frac{97}{3}$

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39. The radius of a sphere is increasing at a rate proportional to itself. If the radius is 4 initially, and the radius is 10 after two seconds, what will the radius be after three seconds?

A. 62.50 B. 13.00 C. 15.81 D. 16.00 E. 25.00

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40. Use differentials to approximate the change in volume of a sphere when the radius is increased from 10 to 10.02 cm.

A. 4,213.973 B. 1,261.669 C. 1,256.637 D. 25.233 E. 25.133

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41. $\int \ln 2x\, dx =$

A. $\frac{\ln 2x}{x} + C$ B. $\frac{\ln 2x}{2x} + C$ C. $x\ln x - x + C$ D. $x\ln 2x - x + C$ E. $2x\ln 2x - 2x + C$

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42. If the function $f(x)$ is differentiable and $f(x) = \begin{cases} ax^3 - 6x; & x \leq 1 \\ bx^2 + 4; & x > 1 \end{cases}$, then $a =$

A. 0 B. 1 C. -14 D. -24 E. 26

43. Two particles leave the origin at the same time and move along the y-axis with their respective positions determined by the functions $y_1 = \cos 2t$ and $y_2 = 4\sin t$ for $0 < t < 6$. For how many values of t do the particles have the same acceleration?

A. 0 B. 1 C. 2 D. 3 E. 4

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44. Find the distance traveled in the first four seconds, for a particle whose velocity is given by $v(t) = 7e^{-t^2}$, where t stands for time.

A. 0.976 B. 6.204 C. 6.359 D. 12.720 E. 7.000

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45. $\int \tan^6 x \sec^2 x\, dx =$

A. $\dfrac{\tan^7 x}{7} + C$ B. $\dfrac{\tan^7 x}{7} + \dfrac{\sec^3 x}{3} + C$ C. $\dfrac{\tan^7 x \sec^3 x}{21} + C$ D. $7\tan^7 x + C$ E. $\dfrac{2}{7}\tan^7 x \sec x + C$
