AP Calculus AB Sample Test II -- Part A
Multiple Choice, NO Calculators

Name: _____
Period: _____

In This Test: **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.**

1. $\int_0^2 (2x^3+3)dx =$

a. 8 b. 11 c. 14 d. 20 e. 24

2. If $f(x) = (2+3x)^4$, then the 4th derivative of *f* is:

a. 0 b. $4!(3)$ c. $4!(3^4)$
d. $4!(3^5)$ e. $4!(2+3x)$

3. $\int_2^4 |x-3|\,dx =$

a. 1 b. –1 c. 0 d. –2 e. 6

4. At what value(s) of *x* does $f(x) = x^4 - 8x^2$ have a relative minimum?

a. 0 and –2 only b. 0 and 2 only c. 0 only
d. –2 and 2 only e. –2, 0, and 2

5. The region in the **first quadrant** bounded by $y = \cos x$, $y = \sin x$, and the *y*-axis is rotated about the *x*-axis. The volume of the resulting solid is:

a. $\frac{\pi}{2}$ b. π c. $\frac{1}{2}$ d. $\pi(\sqrt{2}-1)$ e. $\frac{\pi}{4}-\frac{1}{2}$

6. The $\lim_{h\to 0}\frac{|x+h|-|x|}{h}$ at $x = 3$ is:

a. 0 b. 1 c. 3 d. –1 e. Nonexistent

7. The average value of the function *f(x)* = sin *x* on the closed interval $\left[0, \frac{\pi}{2}\right]$ is:

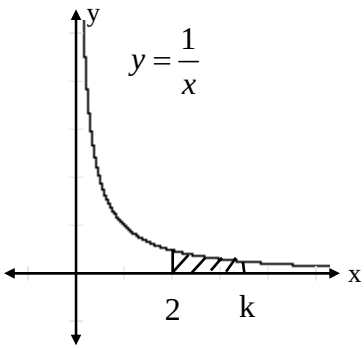
a. $\frac{\pi}{4}$ b. $\frac{\pi}{2}$ c. 1 d. $\frac{3\pi}{2}$ e. $\frac{2}{\pi}$

8. Let *f* be the function given by $f(x) = x^3$. What are all the values of *c* that satisfy the conclusion of the Mean Value Theorem on the closed interval [–1, 2]?

a. 0 only b. 1 only c. $\sqrt{3}$ only
d. –1 and 1 e. $-\sqrt{3}$ and $\sqrt{3}$

9. For the figure to the right, the area of the shaded region is ln 4 when *k* is:

a. 4 b. 8 c. *e*
d. e^2 e. e^3



10. If $x + y = xy$, then $\frac{dy}{dx}$ *is*:

a. $\frac{1}{x-1}$ b. $\frac{y-1}{x-1}$ c. $\frac{1-y}{x-1}$
d. $x + y - 1$ e. $\frac{2-xy}{y}$

11. If $g(x) = \ln(\ln 2x)$, then $g'(x) =$

a. $\frac{x}{\ln 2x}$ b. $\frac{1}{x(\ln 2x)}$ c. $\frac{1}{\ln 2x}$
d. $\frac{2}{\ln 2x}$ e. $\frac{1}{\ln(\ln 2x)}$

12. If $f(x) = \frac{x}{x+1}$ for $x \neq -1$, then the range of *f* is:

a. all real numbers b. $y \neq -1$ c. $y \neq 1$
d. $y \leq 1$ e. $y < 1$

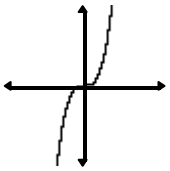
13. In which interval is the function $f(x) = x^3 + 6x^2 + 9x + 1$ increasing?

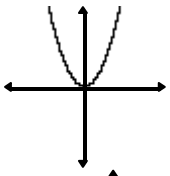
a. $(-\infty, -3)$ only b. (–3, –1) only
c. $(-1, \infty)$ only d. $(-\infty, -3) \cup (-1, \infty)$
e. $(-\infty, -3) \cup (1, \infty)$

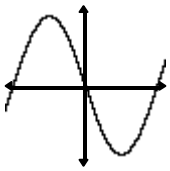
14. If $\int_0^2 (2x^3 - kx^2 + 2k)dx = 12$, then *k* must be:

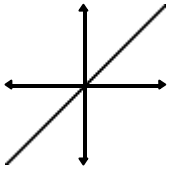
a. 1 b. 2 c. 3 d. –2 e. –3

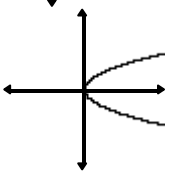
15. Which of the following resembles an even function?

a. 

b. 

c. 

d. 

e. 

16. $\int (\sec^2 x)(\tan^2 x)dx =$

a. $\frac{1}{3}\tan^3 x + C$ b. $\tan^3 x + C$ c. $\frac{1}{2}\tan^2 x + C$

d. $\frac{1}{3}\sec^3 x + C$ e. $\tan^2 x + C$

17. For $|x| < 1$, the derivative of $y = \ln\sqrt{1-x^2}$ is:

a. $\frac{x}{1-x^2}$ b. $\frac{x}{x^2-1}$ c. $\frac{-x}{x^2-1}$

d. $\frac{1}{2(1-x^2)}$ e. $\frac{1}{\sqrt{1-x^2}}$

18. If $f(x) = 2e^{2x}$, then $f'(\ln 3) =$

a. 9 b. 18 c. 24 d. 32 e. 36

19. Consider the function $f(x) = \begin{cases} \frac{\sin x}{x}, & x \neq 0 \\ k, & x = 0 \end{cases}$

In order for *f(x)* to be continuous at $x = 0$, the value of *k* must be:

a. 0 b. 1 c. –1

d. π e. a number greater than 1

20. What are all the values of *x* for which the graph of $y = x^3 - 6x^2$ is concave downward?

a. $0 < x < 4$ b. $x > 2$ c. $x < 2$

d. $x < 0$ e. $x > 4$

21. If $\frac{dy}{dx} = e^{3x}$, then *y* could be:

a. $3e^{3x}$ b. e^{x^3} c. $\frac{1}{3}e^{x^3}$ d. $3e^{x^3}$ e. $\frac{1}{3}e^{3x}$

22. If the fundamental period of the function $f(x) = 3\cos\left(\frac{kx}{2}\right)$ is $\frac{2\pi}{3}$ then the value of *k* may be:

a. 2 b. 3 c. 4 d. 6 e. 8

23. If $y = xe^x$, then $\frac{d^n y}{dx^n} =$

a. e^x b. e^{nx} c. $(x+n)e^x$

d. $x^n e^x$ e. $(x+n^2)e^x$

24. A particle moves on the *x*-axis in such a way that its position at time *t* is given by $x(t) = 3t^5 - 25t^3 + 60t$. For what values of *t* is the particle moving to the left?

a. $-2 < t < 1$ only
b. $-2 < t < -1$ and $1 < t < 2$
c. $-1 < t < 1$ and $t > 2$
d. $1 < t < 2$ only
e. $t < -2$, $-1 < t < 1$, and $t > 2$

25. The equation of a **normal** line to the curve $y = \sqrt[3]{x^2 - 1}$ at the point where $x = 3$ is:

a. $y + 12x = 38$ b. $y - 4x = 10$

c. $y + 2x = 4$ d. $y + 2x = 8$

e. $y - 2x = -4$

1. C	6. B	11. B	16. A	21. E
2. C	7. E	12. C	17. B	22. D
3. A	8. B	13. D	18. E	23. C
4. D	9. B	14. C	19. B	24. B
5. A	10. C	15. B	20. C	25. D