# BALTIMORE COUNTY PUBLIC SCHOOLS

## OFFICE OF MATHEMATICS

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SAMPLE MULTIPLE CHOICE QUESTIONS

# AP-LEVEL CALCULUS

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MULTIPLE-CHOICE. NO CALCULATOR.

1. $\int_1^2 \frac{x^4 - 2}{x^3}\, dx$

A) $\ln 2 - 2$ B) $\ln 2 - \frac{1}{8}$ C) $\frac{3}{4}$ D) $2$ E) $\frac{11}{4}$

2. Let $f(x) = \frac{|x|}{x}$. Then $\lim_{x \to 0^+} \left( \frac{df}{dx} \right)$ is

A) $-1$ B) $0$ C) $1$ D) $\ln 2$ E) not defined

3. $\lim_{n \to \infty} \left( 1 + \frac{3}{n} \right)^n$

A) $0$ B) $1$ C) $3e$ D) $e^3$ E) $\infty$

4. Let $g(x) = \frac{1}{\sqrt{x^2 - 4}}$. Which of the following is <u>NOT</u> true?

A) $\lim_{x \to 2^+} g(x) = \infty$

B) Domain of $g(x)$ is $(-2, 2)$

C) Range of $g(x)$ is $(0, \infty)$

D) $g(-2)$ does not exist

E) $g$ is an even function

5. $\lim_{h \to 0} \frac{\ln(x + h) - \ln(x)}{h}$

A) $0$ B) $\frac{1}{x}$ C) $e^x$ D) $x \ln x - x$ E) None of these

5. Let $x^2 + xy - y^2 = 2$. Find $\frac{dy}{dx}$ at the point ( a, b ).

A) $\frac{a - 2b}{2a + b}$ B) $\frac{2a + b}{a - 2b}$ C) $\frac{3a}{a - 2b}$ D) $\frac{-2a - b}{a - 2b}$ E) $\frac{a - 2b}{3a}$

6. Let $h(x) = x^4 + 4x^3 - 18x^2$. On what interval is h (x) concave down?

A) $(-\infty, -3)$ B) $(-1, 3)$ C) $(-3, 1)$ D) $(1, \infty)$ E) None of these

7. Let $f(x) = (2x + 3)^5$. The fifth derivative of f (x) at $x = \frac{-3}{2}$ is

A) 0 B) 180 C) 360 D) 2,880 E) 11,520