

AP Calculus BC - Mathematics Exam 2018 - Release Items

1. At which positive value of x is the slope of the tangent line to

$$f(x) = 6 \ln x - 2x^2$$

equal to -10 ?

- (a) 0
 - (b) 1
 - (c) 2
 - (d) 3
 - (e) 4
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2. Evaluate the integral $\int_0^{\pi} (1 - \theta^2) \sin \theta \, d\theta$. (Round your answer to the nearest integer.)

- (a) -12
 - (b) -4
 - (c) 0
 - (d) 4
 - (e) 12
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3. What is the coefficient of x^4 in the Taylor series expansion about $x = 0$ for $f(x) = e^{x^2}$?

- (a) 0
 - (b) $\frac{1}{24}$
 - (c) $\frac{1}{6}$
 - (d) $\frac{1}{2}$
 - (e) 1
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4. If the base b of a triangle is increasing at a rate of 3 inches per minute while its height h is decreasing at a rate of 3 inches per minute, which of the following must be true about the area A of the triangle?

- (a) A remains constant
- (b) A is always increasing
- (c) A is always decreasing
- (d) A is decreasing only when $b < h$

(e) A is decreasing only when $b > h$

5. Find the sum of the series: $\frac{1}{2} - \frac{1}{3} + \frac{2}{9} - \cdots + \frac{2^{n-1}}{(-3)^n} + \cdots$

(a) $-\frac{2}{3}$

(b) $\frac{3}{10}$

(c) $\frac{1}{5}$

(d) $\frac{3}{5}$

(e) $\frac{3}{2}$

6. Let $f(x) = x + \sin x$. What is the value of $(f^{-1})'(0)$?

(a) -1

(b) 0

(c) $\frac{1}{2}$

(d) 1

(e) Does not exist

7. Let f be a twice differentiable function with $f(1) = 3$, $f'(1) = 6$, and $f''(1) = 2$. What is the value of the approximation of $f(0.8)$ using the line tangent to the graph of f at $x = 1$?

(a) 1.2

(b) 1.8

(c) 2.8

(d) 4.2

(e) 4.8

8. Find the slope of the tangent line to the curve $(2xy + 4)^2 = 4y$ at the point $(0, 4)$.

(a) 1

(b) 2

(c) 8

(d) 12

(e) 16
