

SET I OF MULTIPLE CHOICE - NO CALCULATOR

- 1) If $\begin{cases} f(x) = \frac{\sqrt{2x+5} - \sqrt{x+7}}{x-2}, & \text{for } x \neq 2, \\ f(2) = k \end{cases}$ and if f is continuous at $x = 2$, then $k =$
- (A) 0 (B) $\frac{1}{6}$ (C) $\frac{1}{3}$ (D) 1 (E) $\frac{7}{5}$
- 2) If $3x^2 + 2xy + y^2 = 2$, then the value of $\frac{dy}{dx}$ at $x = 1$ is
- (A) -2 (B) 0 (C) 2 (D) 4 (E) not defined
- 3) What is $\lim_{h \rightarrow 0} \frac{8\left(\frac{1}{2} + h\right)^8 - 8\left(\frac{1}{2}\right)^8}{h}$?
- (A) 0 (B) $\frac{1}{2}$ (C) 1 (D) The limit does not exist.
- (E) It cannot be determined from the information given.
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- 4) When the area in square units of an expanding circle is increasing twice as fast as its radius in linear units, the radius is
- (A) $\frac{1}{4\pi}$ (B) $\frac{1}{4}$ (C) $\frac{1}{\pi}$ (D) 1 (E) π
- 5) If $f(x) = \frac{4}{x-1}$ and $g(x) = 2x$, then the solution set of $f(g(x)) = g(f(x))$ is
- (A) $\left\{\frac{1}{3}\right\}$ (B) $\{2\}$ (C) $\{3\}$ (D) $\{-1, 2\}$ (E) $\left\{\frac{1}{3}, 2\right\}$
- 6) If $f'(x)$ and $g'(x)$ exist and $f'(x) > g'(x)$ for all real x , then the graph of $y = f(x)$ and the graph of $y = g(x)$
- (A) intersect exactly once.
(B) intersect no more than once.
(C) do not intersect.
(D) could intersect more than once.
(E) have a common tangent at each point of intersection.

- 7) If $f(x) = 2 + |x - 3|$ for all x , then the value of the derivative $f'(x)$ at $x = 3$ is
- (A) -1 (B) 0 (C) 1 (D) 2 (E) nonexistent
- 8) The approximate value of $y = \sqrt{4 + \sin x}$ at $x = 0.12$, obtained from the tangent to the graph at $x = 0$, is
- (A) 2.00 (B) 2.03 (C) 2.06 (D) 2.12 (E) 2.24
- 9) If $\frac{d}{dx}(f(x)) = g(x)$ and $\frac{d}{dx}(g(x)) = f(x^2)$, then $\frac{d^2}{dx^2}(f(x^3)) =$
- (A) $f(x^6)$ (B) $g(x^3)$ (C) $3x^2g(x^3)$
- (D) $9x^4f(x^6) + 6xg(x^3)$ (E) $f(x^6) + g(x^3)$