

1. If $y = x^2e^x$, then $\frac{dy}{dx} =$

(A) $2xe^x$

(B) $x(x + 2e^x)$

(C) $xe^x(x + 2)$

(D) $2x + e^x$

(E) $2x + e$



2. What is the domain of the function f given by $f(x) = \frac{\sqrt{x^2 - 4}}{x - 3}$?

(A) $\{x: x \neq 3\}$

(B) $\{x: |x| \leq 2\}$

(C) $\{x: |x| \geq 2\}$

(D) $\{x: |x| \geq 2 \text{ and } x \neq 3\}$

(E) $\{x: x \geq 2 \text{ and } x \neq 3\}$



3. A particle with velocity at any time t given by $v(t) = e^t$ moves in a straight line. How far does the particle move from $t = 0$ to $t = 2$?

(A) $e^2 - 1$

(B) $e - 1$

(C) $2e$

(D) e^2

(E) $\frac{e^3}{3}$



4. The graph of $y = \frac{-5}{x-2}$ is concave downward for all values of x such that

(A) $x < 0$

(B) $x < 2$

(C) $x < 5$

(D) $x > 0$

(E) $x >$



5. $\int \sec^2 x \, dx =$

(A) $\tan x + C$

(B) $\csc^2 x + C$

(C) $\cos^2 x + C$

(D) $\frac{\sec^3 x}{3} + C$

(E) $2 \sec^2 x \tan x + C$



6. If $y = \frac{\ln x}{x}$, then $\frac{dy}{dx} =$

(A) $\frac{1}{x}$

(B) $\frac{1}{x^2}$

(C) $\frac{\ln x - 1}{x^2}$

(D) $\frac{1 - \ln x}{x^2}$

(E) $\frac{1 + \ln x}{x^2}$



7. $\int \frac{x \, dx}{\sqrt{3x^2 + 5}} =$

(A) $\frac{1}{9}(3x^2 + 5)^{\frac{3}{2}} + C$

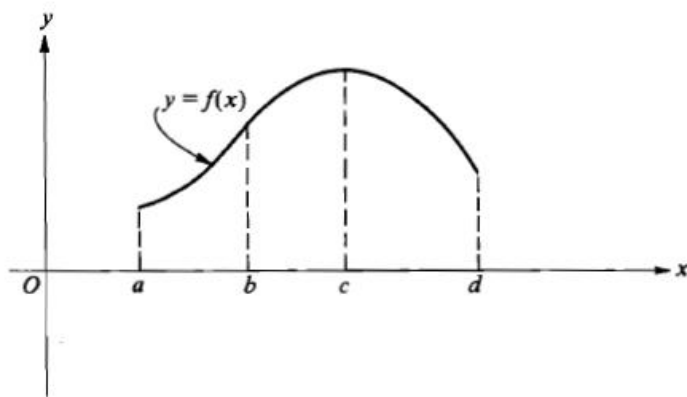
(B) $\frac{1}{4}(3x^2 + 5)^{\frac{3}{2}} + C$

(C) $\frac{1}{12}(3x^2 + 5)^{\frac{1}{2}} + C$

(D) $\frac{1}{3}(3x^2 + 5)^{\frac{1}{2}} + C$

(E) $\frac{3}{2}(3x^2 + 5)^{\frac{1}{2}} + C$





8. The graph of $y = f(x)$ is shown in the figure above. On which of the following intervals are $\frac{dy}{dx} > 0$ and $\frac{d^2y}{dx^2} < 0$?

- I. $a < x < b$
- II. $b < x < c$
- III. $c < x < d$

(A) I only

(B) II only

(C) III only

(D) I and II

(E) II and III



9. If $x + 2xy - y^2 = 2$, then at the point $(1, 1)$, $\frac{dy}{dx}$ is

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

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

(C) 0

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

(E) nonexistent



10. If $\int_0^k (2kx - x^2)dx = 18$, then $k =$

(A) -9

(B) -3

(C) 3

(D) 9

(E) 18



Answer Key—Read Straight across to be in correct order

#1) C #7) D #10) C #2) D #8) B #5) A #3) A

#9) E #4) E #6) D

I use <http://zxing.appspot.com/generator> to create my codes.