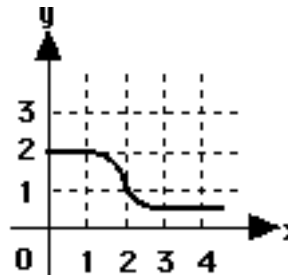


1. The graph of the function  $f$  is shown in the figure above. Which of the following statements about  $f$  is true?

- A)  $\lim_{x \rightarrow a} f(x) = \lim_{x \rightarrow b} f(x)$       B)  $\lim_{x \rightarrow a} f(x) = 2$       C)  $\lim_{x \rightarrow b} f(x) = 2$   
 D)  $\lim_{x \rightarrow b} f(x) = 1$       E)  $\lim_{x \rightarrow a} f(x)$  does not exist.



2. The graph of  $f$  is shown in the figure above. If  $\int_1^3 f(x) \, dx = 2.3$  and  $F'(x) = f(x)$ , then  $F(3) - F(0) =$   
 A) 0.3      B) 1.3      C) 3.3      D) 4.3      E) 5.3

3. What is the area of the region in the first quadrant enclosed by the graphs of  $y = \cos x$ ,  $y = x$ , and the  $y$ -axis?      A) 0.127      B) 0.385      C) 0.400      D) 0.600      E) 0.947

4. The base of a solid  $S$  is the region enclosed by the graph of  $y = \sqrt{\ln x}$ , the line  $x = e$ , and the  $x$ -axis. If the cross sections of  $S$  perpendicular to the  $x$ -axis are squares, then the volume of  $S$  is  
 A)  $\frac{1}{2}$       B)  $\frac{2}{3}$       C) 1      D) 2      E)  $\frac{1}{3}(e^3 - 1)$

5. If the derivative of  $f$  is given by  $f'(x) = e^x - 3x^2$ , at which of the following values of  $x$  does  $f$  have a relative maximum value?      A) -0.46      B) 0.20      C) 0.91      D) 0.95      E) 3.73

6. Let  $f(x) = \sqrt{x}$ . If the rate of change of  $f$  at  $x = c$  is twice its rate of change at  $x = 1$ , then  $c =$   
 A)  $\frac{1}{4}$       B) 1      C) 4      D)  $\frac{1}{\sqrt{2}}$       E)  $\frac{1}{2\sqrt{2}}$

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7. At time  $t \geq 0$ , the acceleration of a particle moving on the  $x$ -axis is  $a(t) = t + \sin t$ . At  $t = 0$ , the velocity of the particle is  $-2$ . For what value of  $t$  will the velocity of the particle be zero?
- A) 1.02      B) 1.48      C) 1.85      D) 2.81      E) 3.14

$x$	0	0.5	1	1.5	2
$f(x)$	3	3	5	8	13

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8. A table of values for a continuous function  $f$  is shown above. If four equal subintervals of  $[0, 2]$  are used, which of the following is the trapezoidal approximation of  $\int_0^2 f(x) dx$ ?
- A) 8      B) 12      C) 16      D) 24      E) 32

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9. The average value of  $\cos x$  on the interval  $[-3, 5]$  is
- A)  $\frac{\sin 5 - \sin 3}{8}$       B)  $\frac{\sin 5 - \sin 3}{2}$       C)  $\frac{\sin 3 - \sin 5}{2}$       D)  $\frac{\sin 3 + \sin 5}{2}$       E)  $\frac{\sin 3 + \sin 5}{8}$

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10. At what point on the graph of  $y = \frac{1}{2}x^2$  is the tangent line parallel to the line  $2x - 4y = 3$ ?

- A)  $\left(\frac{1}{2}, \frac{-1}{2}\right)$       B)  $\left(\frac{1}{2}, \frac{1}{8}\right)$       C)  $\left(1, \frac{-1}{4}\right)$       D)  $\left(1, \frac{1}{2}\right)$       E)  $(2, 2)$
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