42. Let $g$ be the function defined by $g(x)=\int_{3}^{x}\left(\left(5+4 t-t^{2}\right)\left(2^{-t}\right)\right) d t$. Which of the following statements about $g$ must be true?
I. $g$ is increasing on $(3,5)$.
II. $g$ is increasing on $(5,7)$.
III. $g(7)<0$
(A) I only
(B) II only
(C) III only
(D) I and III only
(E) I, II, and III

Answer

43. A region R is enclosed by the coordinate axes and the graph of $y=k(x-5)^{2}, k>0$. When this region is revolved around the $x$-axis, the solid formed has a volume of $2500 \pi$ cubic units. What is the value of $k$ ?
(A) 60
(B) $2 \sqrt{15}$
(C) 4
(D) $\sqrt{5}$
(E) 2

44. The graph above shows a function $f$ with a relative minimum at $x=2$. The approximation of $f(x)$ near $x=2$ using a second-degree Taylor polynomial centered about $x=2$ is given by $a+b(x-2)+c(x-2)^{2}$.

Which of the following is true about $a, b$, and $c$ ?
(A) $a<0, b=0, c>0$
(B) $a>0, b=0, c<0$
(C) $a<0, b<0, c<0$
(D) $a<0, b>0, c>0$
(E) $a>0, b=0, c>0$

45. The solution of the differential equation $\frac{d y}{d x}=-\frac{x^{2}}{y}$ contains the point $(3,-2)$. Using Euler's method with $\Delta x=-0.3$, what is the approximate value of $y$ when $x=2.7$ ?
(A) -2.98
(B) -3.00
(C) -3.08
(D) -3.25
(E) -3.35

Answer
$\square$

