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1. A differentiable function f has the property that $f(5) = 3$ and $f'(5) = 4$. What is the estimate for $f(4.8)$ using the local linear approximation for f at $x = 5$?
- (A) 2.2
(B) 2.8
(C) 3.4
(D) 3.8
(E) 4.6
2. Let f be a differentiable function such that $f(3) = 2$ and $f'(3) = 5$. If the tangent line to the graph of f at $x = 3$ is used to find an approximation to a zero of f , that approximation is
- (A) 0.4
(B) 0.5
(C) 2.6
(D) 3.4
(E) 5.5
3. Let f be a differentiable function with $f(2) = 3$ and $f'(2) = \frac{1}{2}$. Using the line tangent to the graph of f at $x = 2$ as a local linear approximation for f , what is the estimate for $f(1.8)$?
- (A) 2.5
(B) 2.8
(C) 2.9
(D) 3.1
4. Let f be a function such that at each point (x, y) on the graph of f , the slope is given by $\frac{dy}{dx} = y^2 - x$. The graph of f passes through the point $(1, 2)$ and is concave down on the interval $1 < x < 1.5$. Let k be the approximation for $f(1.2)$ found by using the locally linear approximation of f at $x = 1$. Which of the following statements about k is true?
- (A) $k = 5.6$ and is an overestimate for $f(1.2)$.
(B) $k = 5.6$ and is an underestimate for $f(1.2)$.
(C) $k = 2.6$ and is an overestimate for $f(1.2)$.
(D) $k = 2.6$ and is an underestimate for $f(1.2)$.

5.

x	3.8	4.0	4.2	4.4
$g'(x)$	-0.8	2.2	1.8	-1.2

Selected values of the derivative of the function g are given in the table above. It is known that $g(4) = 12$. What is the approximation for $g(4.2)$ found using the line tangent to the graph of g at $x = 4$?

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- (A) 12.44
- (B) 12.40
- (C) 12.36
- (D) 11.60

6.

x	2.8	3.0	3.2	3.4
$g'(x)$	1.05	-1.2	-0.8	1.3

Selected values of the derivative of the function g are given in the table above. It is known that $g(3) = 17$. What is the approximation for $g(3.2)$ found using the line tangent to the graph of g at $x = 3$?

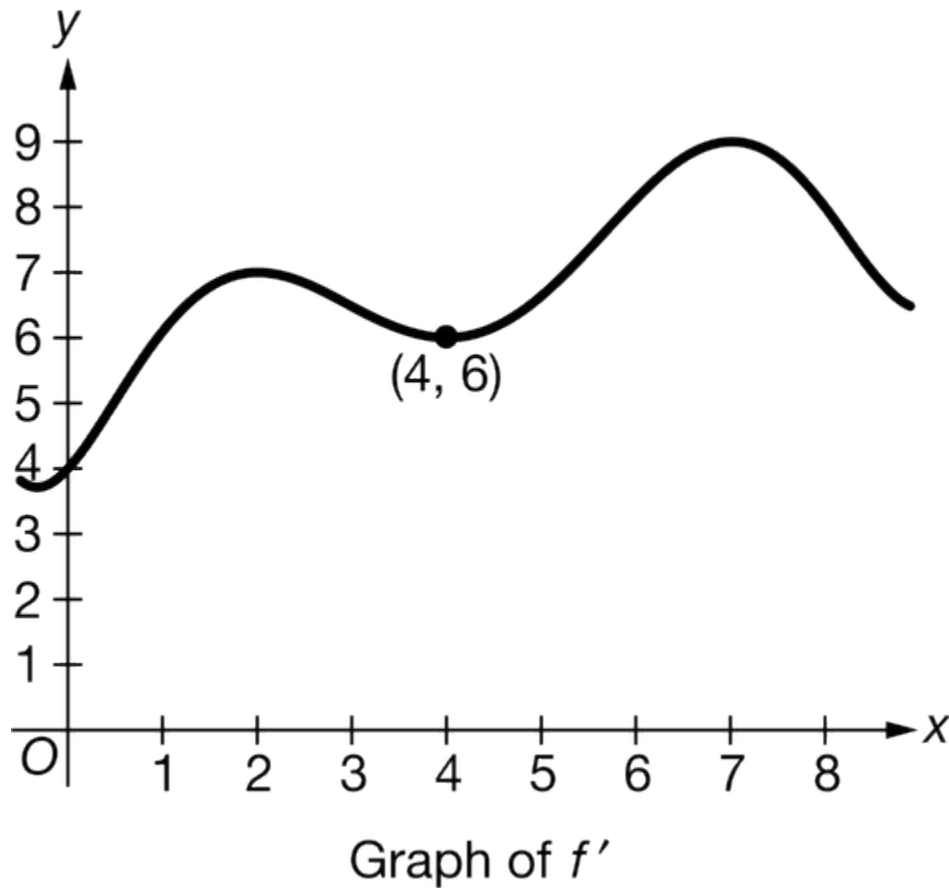
- (A) 16.76
- (B) 16.80
- (C) 16.84
- (D) 17.40

7.  At time t , $0 < t < 2$, the velocity of a particle moving along the x -axis is given by $v(t) = t \sin(t^3)$. Let $t = b$ be the time at which the particle changes direction from moving left to moving right. What is the total distance traveled by the particle during the time interval $0 < t < b$?

- (A) 0.212
- (B) 0.612
- (C) 1.011
- (D) 1.208

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8.



The graph of f' , the derivative of the function f , is shown above. If $f(4) = -1$, what is the approximation for $f(4.5)$ using the line tangent to the graph of f at $x = 4$?

- (A) -4
 (B) -1
 (C) 2
 (D) 6
9. Let f be a twice-differentiable function such that $f''(x) < 0$ for all x . The graph of $y = S(x)$ is the secant line passing through the points $(3, f(3))$ and $(5, f(5))$. The graph of $y = T(x)$ is the line tangent to the graph of f at $x = 4$. Which of the following is true?
- (A) $f(4.2) < S(4.2) < T(4.2)$
 (B) $f(4.2) < T(4.2) < S(4.2)$
 (C) $S(4.2) < f(4.2) < T(4.2)$
 (D) $T(4.2) < f(4.2) < S(4.2)$
10. Let f be the function given by $f(x) = 2 \cos x + 1$. What is the approximation for $f(1.5)$ found by using the line tangent to the graph of f at $x = \pi/2$?

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- (A) -2
- (B) 1
- (C) $\pi - 2$
- (D) $4 - \pi$