Tangent Lines (No Calculator)

1997 #10

An equation of the line tangent to the graph of $y = \cos(2x)$ at $x = \frac{\pi}{6}$ is

(A) $y - \frac{1}{2} = \sqrt{3}(x - \frac{\pi}{6})$

(B) $y - \frac{1}{2} = -\sqrt{3}(x - \frac{\pi}{6})$

(C) $y - \frac{\sqrt{3}}{2} = (x - \frac{\pi}{6})$

(D) $y - \frac{\sqrt{3}}{2} = -(x - \frac{\pi}{6})$

(E) $y - \frac{1}{2} = (x - \frac{\pi}{6})$

1997 #12

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)

1997 #14

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

2003 #16

If the line tangent to the graph of the function f at the point (1, 7) passes through the point (-2, -2), then $f'(1)$ is

(A) -5 (B) 1 (C) 3 (D) 7 (E) undefined

2003 #24

Let f be the function defined by $f(x) = 4x^3 - 5x + 3$. Which of the following is an equation of the line tangent to the graph of f at the point where $x = -1$?

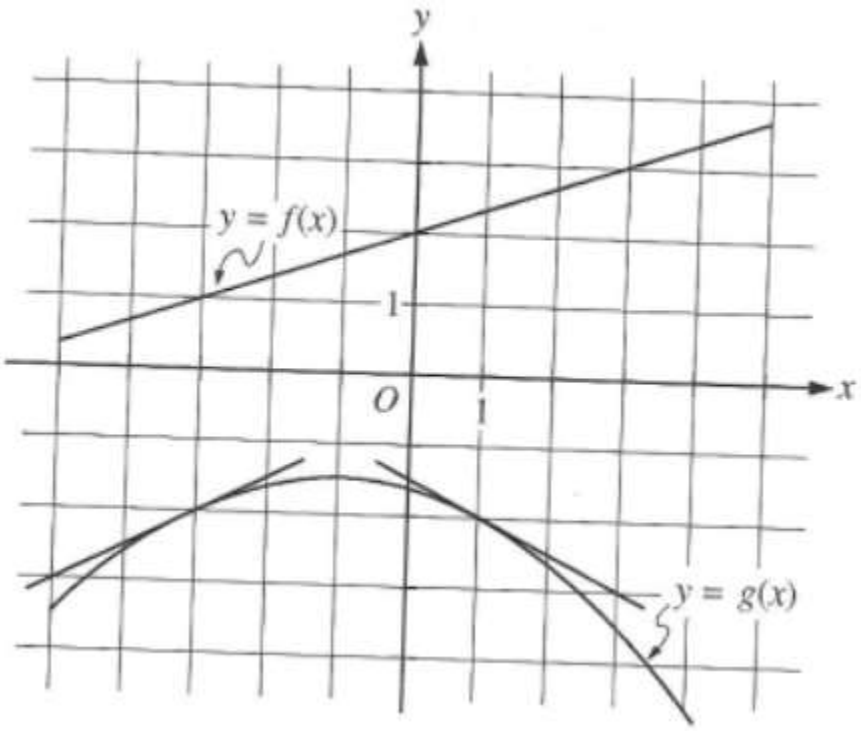
(A) $y = 7x - 3$ (B) $y = 7x + 7$ (C) $y = 7x + 11$ (D) $y = -5x - 1$ (E) $y = -5x - 5$

2008 #24

The function f is twice differentiable with $f(2) = 1$, $f'(2) = 4$, and $f''(2) = 3$. What is the value of the approximation of $f(1.9)$ using the tangent line to the graph of f at $x = 2$?

(A) 0.4 (B) 0.6 (C) 0.7 (D) 1.3 (E) 1.4

2008 #92 (BC)



The figure above shows the graphs of the functions f and g. The graphs of the lines tangent to the graph of g at $x = -3$ and $x = 1$ are also shown. If $B(x) = g(f(x))$, what is $B'(-3)$?

(A) $-\frac{1}{2}$ (B) $-\frac{1}{6}$ (C) $\frac{1}{6}$ (D) $\frac{1}{3}$ (E) $\frac{1}{2}$