

1. The curve  $x^3 + x \tan y = 27$  passes through  $(3,0)$ . Use the tangent line there to estimate the value of  $y$  at  $x = 3.1$ . The value is
- (A)  $-2.7$       (B)  $-0.9$       (C)  $0$       (D)  $0.1$       (E)  $3.0$
2. If  $G(2) = 5$  and  $G'(x) = \frac{10x}{9-x^2}$ , then an estimate of  $G(2.2)$  using a tangent-line approximation is
- (A)  $5.4$       (B)  $5.5$       (C)  $5.8$       (D)  $8.8$       (E)  $13.8$
3. Consider the function  $f(x) = x^2 \sin(\pi x) - 3x$ . Which of the following is a linear approximation to  $f$  at  $x = 1$ ?
- (A)  $f(x) = (2x \sin(\pi x) + x^2 \pi \cos(\pi x) - 3)x - 1$   
(B)  $f(x) = -x - 1$   
(C)  $f(x) = -\pi x + \pi$   
(D)  $f(x) = (-\pi - 3)x + \pi$   
(E)  $f(x) = (2x \sin(\pi x) + x^2 \pi \cos(\pi x) - 3)x + \pi$
4.  $\int x\sqrt{3x} dx =$
- (A)  $\frac{2\sqrt{3}}{5}x^{\frac{5}{2}} + c$       (B)  $\frac{5\sqrt{3}}{2}x^{\frac{5}{2}} + c$       (C)  $\frac{\sqrt{3}}{2}x^{\frac{1}{2}} + c$   
(D)  $2\sqrt{3x} + c$       (E)  $\frac{5\sqrt{3}}{2}x^{\frac{3}{2}} + c$
5.  $\int e^{4-\ln x} dx =$
- (A)  $\ln|x| + c$       (B)  $(e^4)x - \frac{x^2}{2} + c$       (C)  $\frac{e^4}{2}x^2 + c$   
(D)  $\left(\frac{e^8}{2}\right)\ln|x| + c$       (E)  $e^4 \ln|x| + c$