

CALCULUS I -- Worksheet #54

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1. A sphere of radius 10 cm is to be turned out on a lathe. If the radius is made 0.1 cm too long, what is the percentage of error made in the surface area of the sphere? ($S = 4\pi r^2$)
(A) 20% (B) 8% (C) 5% (D) 2% (E) 7%
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2. A circle is to be drawn with radius 3.5 inches. If the radius is measured as 3.6 instead, what error does this cause in the area of the circle? (Leave answer in terms of π .)
(A) $7\pi \text{ in}^2$ (B) $0.7\pi \text{ in}^3$ (C) $0.07\pi \text{ in}^2$ (D) $0.35\pi \text{ in}^2$ (E) $0.7\pi \text{ in}^2$
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3. Approximate $\sqrt{8.2}$ using differentials.
(A) 2.8667 (B) 3.1333 (C) 2.8333 (D) 2.8636 (E) none of these
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4. $f(x) = x^3 - 2x + 3$ Approximate $f(2.1)$ using tangent line approximations (differentials).
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5. If $f(x) = x^3 - x - 1$ and $x_0 = 1.5$, then x_3 using Newton's Method is
(A) 1.3247 (B) 1.3252 (C) 1.3478 (D) 1.3389 (E) none of these
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6. Find the x -coordinates of all points of intersection of the curves $y = x^3$ and $y = \frac{1}{2}x - 1$ using Newton's Method. (A) -1 (B) -1.240 (C) -1.170 (D) -1.165 (E) none of these
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7. The average (mean) value of $y = (x - 3)^2$ over the interval from $x = 1$ to $x = 3$ equals
A) 2 B) $\frac{2}{3}$ C) $\frac{4}{3}$ D) $\frac{8}{3}$ E) none of these
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8. If the displacement from the origin of a particle on a line is given by $s = 3 + (t - 2)^4$, then the number of times the particle reverses direction is: (A) 0 (B) 1 (C) 2 (D) 3 (E) none of these
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9. Which of the following functions fails to satisfy the conclusion of the Mean Value Theorem on the given interval?
(A) $f(x) = 3x^2 - 2x$ on $[0, 1]$ (B) $f(x) = x^{-2}$ on $[-1, 1]$
(C) $f(x) = x^{2/3}$ on $[1, 2]$ (D) $f(x) = \ln x$ on $[e, 2e]$ (E) $f(x) = e^x$ on $[1, 3]$
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