EMCF 16

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1. Use one iteration of Newton's method from a guess of $x = 1$ to approximate a solution to $x^4 + x - 1 = 0$. What is the result?
   a. 3/4
   b. 4/5
   c. 5/4
   d. 2/3
   e. 1
   f. None of these.
2. Use one iteration of Newton's method from a guess of $x = 1$ to approximate a solution to $x^4 + 2x - 1 = 0$. What is the result?
   a. 3/4
   b. 4/5
   c. 5/4
   d. 2/3
   e. 1
   f. None of these.
3. Use one iteration of Newton's method to approximate $\sqrt{25.1}$ from a guess of 5, using the function $f(x) = x^2 - 25.1$.
   a. 5.1
   b. 5.05
   c. 5.01
   d. 5.001
   e. 5.005
   f. None of these.
4. Give the slope of the tangent line to the graph of $f(x) = \left(x^4 + x - 1\right)^3 + \sin(\pi x)$ at $x = 1$.
   a. $15 + \pi$
   b. $12 + \pi$
   c. $15 - \pi$
   d. $12 - \pi$
   e. None of these.

5. Give the slope of the tangent line to the graph of $f(x) = x\cos\left(\frac{\pi}{2}x\right)$ at the point where $x = 1$.

   a. $-1/2$
   b. $1/2$
   c. $-\pi/2$
   d. $\pi/2$
   e. 0
   f. None of these.

6. The surface area of a sphere is increasing at the rate of 2 cm^2/min. Give the rate of change of the volume of the sphere when the radius is 2 cm.

   a. 4 cm^3/sec
   b. 2 cm^3/sec
   c. 4/3 cm^3/sec
   d. 2/3 cm^3/sec
   e. None of these.

7. The height is always two times thet radius of an expanding right circular cone, and the volume of the cone is increasing at the rate of 2 cubic inches per minute. How fast is the radius growing when the height is 3 inches?

   a. $\frac{3}{2\pi}$ in/min
   b. $\frac{2}{3\pi}$ in/min
   c. $\frac{3}{4\pi}$ in/min
   d. $\frac{3}{4\pi}$ in/min
   e. π in/min
   f. None of these.

8. Give the slope of the normal line to the graph of $f(x) = x\cos\left(\frac{\pi}{2}x\right)$ at the point where $x = 1$.

   a. -2
   b. 2
   c. $-2/\pi$
   d. $2/\pi$
   e. 0
   f. None of these.

9. Give the value of dy/dx for the curve $3y + xy - x^2 + \sin(x) = 3$ at the point where $x = 0$.

   a. $-1/2$
   b. $1/2$
   c. $-4/3$
   d. $4/3$
   e. 0
   f. None of these.

10. $\lim_{x \to 0} \dfrac{\tan(3x)\sin(5x)}{x\sin(2x)}$

   a. DNE
   b. 4
   c. 2/15
   d. 15/2
   e. 1/4
   f. None of these.