EMCF 09

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1. Give the slope of the tangent line to the graph of $f(x) = \sin(x) - \cos(x)$ at the point where $x = \pi$.
   a. 0
   b. 1
   c. -1
   d. 2
   e. -2
   f. None of these.
2. Give the slope of the tangent line to the graph of $f(x) = \dfrac{2x}{x-1}$ at the point where $x = 0$.
   a. 1
   b. -1
   c. 2
   d. -2
   e. 0
   f. None of these.
3. Give the **largest** value of x for which the derivative of $f(x) = x^3 - 3x + 2$ is 0.
   a. -1
   b. 1
   c. -2
   d. 2
   e. 0
   f. None of these.
4. Let $f(x) = 3 - 2\cos(x)\sin(x)$. Give $f'(\pi/4)$.
   a. -1
   b. 1
   c. 2
   d. -2
   e. 0
   f. None of these.

5. Let $f(x) = -2x^3 + 5x^2 - 7$. Give $f'''(1)$.
   a. 12
   b. -12
   c. -6
   d. 6
   e. $6x$
   f. None of these.

6. Give the derivative of $f(x) = \dfrac{\sin(x) + 2x}{\cos(x)}$ at $x = 0$.
   a. 1
   b. -1
   c. 2
   d. -2
   e. 0
   f. None of these.

7. Give $\dfrac{d^3}{dx^3}\left(\cos(x) - \sin(x)\right)$.
   a. $\cos(x) - \sin(x)$
   b. $-\cos(x) + \sin(x)$
   c. $\cos(x) + \sin(x)$
   d. $-\cos(x) - \sin(x)$
   e. 0
   f. None of these.

8. Let $f(x) = x\sin(x) + \cos(x)$. Give $f'(x)$.
   a. $x\cos(x) - \sin(x)$
   b. $x\cos(x) + \sin(x)$
   c. $x\cos(x)$
   d. $x\sin(x) + \cos(x)$
   e. None of these.

9. Give $\frac{d^2}{dx^2}\left(3x^3-2x+6\right)$.

a. 0
b. 18
c. $9x$
d. $18x$
e. $9x^2-2$
f. None of these.

10. Let $f\left(x\right)=\sin\left(x\right)-x$. Give the value of $\lim_{h\to 0}\frac{f\left(h\right)-f\left(0\right)}{h}$.

a. -1
b. 1
c. 2
d. -2
e. 0
f. None of these.