תרגיל מס.1

עפיף חלומה, 302323001

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1. לגזור פונקציות:

(א)

$$\begin{aligned}\frac{\partial}{\partial x}f\left(x\right) &= \frac{\partial}{\partial x}\left(x^5+2x^4+\left(3x\right)^8\right)\\ &= 5x^4+8x^3+8\cdot 3^8x^7\end{aligned}$$

(ב)

$$\begin{aligned}\frac{\partial}{\partial t}x\left(t\right) &= \frac{\partial}{\partial t}\left(\frac{at^2}{2}+vt+x_0\right)\\ &= at+v\end{aligned}$$

(ג)

$$\begin{aligned}\frac{\partial}{\partial t}j\left(t\right) &= \frac{\partial}{\partial t}\left(b\sin\left(2\omega t\right)\right)\\ &= -2\omega b\cos\left(2\omega t\right)\end{aligned}$$

(ד)

$$\begin{aligned}\frac{\partial}{\partial t}f\left(y\right) &= \frac{\partial}{\partial t}\sin\left(6y\right)\sin\left(4y\right)\\ &= 6\cos\left(6y\right)\sin\left(4y\right)+4\sin\left(6y\right)\cos\left(4y\right)\end{aligned}$$

(ה)

$$\begin{aligned}\frac{\partial}{\partial x}g\left(x\right) &= \frac{\partial}{\partial t}x^2\left(\ln\left(\sin\left(x^4\right)\right)\right)^{-2}\\ &= 2x\left(\ln\left(\sin\left(x^4\right)\right)\right)^{-2}+x^2\cdot\left(-2\left(\ln\left(\sin\left(x^4\right)\right)\right)^{-3}\cdot\frac{1}{\sin\left(x^4\right)}\cdot\left(\cos\left(x^4\right)\cdot 4x^3\right)\right)\end{aligned}$$

2. $v(0) = ?, a(0) = ?$

$$
\begin{aligned}
x(t) &= t^2 \cos(\omega t) \\
v(t) &= 2t \cos(\omega t) + t^2 (-\sin(\omega t) \cdot \omega) \\
&= 2t \cos(\omega t) - t^2 \omega \sin(\omega t) \\
v(t) &= 0 - 0 = 0 \\
a(t) &= 2\cos(\omega t) - 2t\omega \sin(\omega t) - 2t\omega \sin(\omega t) - t^2\omega^2 \cos(\omega t) \\
a(0) &= 2 \cdot 1 - 0 - 0 - 0 = 2
\end{aligned}
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