

# Γ ΛΥΚΕΙΟΥ ΜΕΡΟΣ Α

## 15.8 1)

$$\begin{aligned}
 \text{a)} \quad & \left[ (5\eta\mu x - 4x^3)(4\ln x - 3\sigma\varphi x) \right]' = \\
 & = (5\eta\mu x - 4x^3)'(4\ln x - 3\sigma\varphi x) + (5\eta\mu x - 4x^3)(4\ln x - 3\sigma\varphi x)' = \\
 & = (5\sigma vvx - 12x^2)(4\ln x - 3\sigma\varphi x) + (5\eta\mu x - 4x^3)\left(\frac{4}{x} + \frac{3}{\eta\mu^2 x}\right)
 \end{aligned}$$

$$\begin{aligned}
 \text{b)} \quad & (2x^5 e^x - 3\sqrt{x} \sigma vvx)' = (2x^5 e^x)' - (3\sqrt{x} \sigma vvx)' = \\
 & = (2x^5)' e^x + 2x^5 (e^x)' - (3\sqrt{x})' \sigma vvx - 3\sqrt{x} (\sigma vvx)' = \\
 & = 10x^4 e^x + 2x^5 e^x - \frac{3}{2\sqrt{x}} \sigma vvx + 3\sqrt{x} \eta\mu x
 \end{aligned}$$

## 15.8 2)

$$\begin{aligned}
 & [(3\eta\mu x - 8\sigma vvx)\sqrt{x}]' = (3\eta\mu x - 8\sigma vvx)' \sqrt{x} + (3\eta\mu x - 8\sigma vvx)(\sqrt{x})' = \\
 & = (3\sigma vvx + 8\eta\mu x)\sqrt{x} + \frac{3\eta\mu x - 8\sigma vvx}{2\sqrt{x}}
 \end{aligned}$$

## 15.8 3)

$$\begin{aligned}
 & \left[ (\ln x - 1)\left(\frac{1}{x} - \frac{\eta\mu x}{2}\right) \right]' = (\ln x - 1)' \left(\frac{1}{x} - \frac{\eta\mu x}{2}\right) + (\ln x - 1)\left(\frac{1}{x} - \frac{\eta\mu x}{2}\right)' = \\
 & = \frac{1}{x}\left(\frac{1}{x} - \frac{\eta\mu x}{2}\right) + (\ln x - 1)\left(-\frac{1}{x^2} - \frac{\sigma vvx}{2}\right)
 \end{aligned}$$

## 15.8 4)

$$\begin{aligned}
 & [(2\sqrt{x} - 3x^4)(5^x - \varepsilon\varphi x)]' = (2\sqrt{x} - 3x^4)'(5^x - \varepsilon\varphi x) + (2\sqrt{x} - 3x^4)(5^x - \varepsilon\varphi x)' = \\
 & = \left(\frac{2}{2\sqrt{x}} - 12x^3\right)(5^x - \varepsilon\varphi x) + (2\sqrt{x} - 3x^4)\left(5^x \ln 5 - \frac{1}{\sigma vvx^2}\right)
 \end{aligned}$$

## 15.8 5)

$$\begin{aligned}
 & \left[ \left(\frac{1}{x} - \sigma\varphi x\right)(5e^x + 2\ln x) \right]' = \left(\frac{1}{x} - \sigma\varphi x\right)'(5e^x + 2\ln x) + \left(\frac{1}{x} - \sigma\varphi x\right)(5e^x + 2\ln x)' = \\
 & = \left(-\frac{1}{x^2} + \frac{1}{\eta\mu^2 x}\right)(5e^x + 2\ln x) + \left(\frac{1}{x} - \sigma\varphi x\right)\left(5e^x + \frac{2}{x}\right)
 \end{aligned}$$

## 15.8 6)

$$\begin{aligned}
 & (x \ln x + 3\eta\mu x \sigma vvx)' = (x)' \ln x + x(\ln x)' + (3\eta\mu x)' \sigma vvx + 3\eta\mu x (\sigma vvx)' = \\
 & = \ln x + x \cdot \cancel{x} + 3\sigma vvx \sigma vvx - 3\eta\mu x \eta\mu x = \ln x + 1 + 3\sigma vvx^2 x - 3\eta\mu^2 x
 \end{aligned}$$

## 15.8 7)

$$(5e^x \varepsilon\varphi x - 4x^2 \ln x)' = (5e^x)' \varepsilon\varphi x + 5e^x (\varepsilon\varphi x)' - (4x^2)' \ln x - 4x^2 (\ln x)' =$$

$$= 5e^x \varepsilon \varphi x + 5e^x \frac{1}{\sigma v v^2 x} - 8x \ln x - 4x^2 \frac{1}{x} = 5e^x \varepsilon \varphi x + \frac{5e^x}{\sigma v v^2 x} - 8x \ln x - 4x$$

**15.8 8)**

$$(x^2 \sigma \varphi x - 4x^3 e^x)' = (x^2)' \sigma \varphi x + x^2 (\sigma \varphi x)' - (4x^3)' e^x - 4x^3 (e^x)' =$$

$$= 2x \sigma \varphi x - x^2 \frac{1}{\eta \mu^2 x} - 12x^2 e^x - 4x^3 e^x = 2x \sigma \varphi x - \frac{x^2}{\eta \mu^2 x} - 12x^2 e^x - 4x^3 e^x$$

**15.8 9)**

$$[(6x^2 + 11)\eta \mu x - (x^2 + 8)\sigma v v x]' =$$

$$= (6x^2 + 11)' \eta \mu x + (6x^2 + 11)(\eta \mu x)' - (x^2 + 8)' \sigma v v x - (x^2 + 8)(\sigma v v x)' =$$

$$= 12x \eta \mu x + (6x^2 + 11)\sigma v v x - 2x \sigma v v x + (x^2 + 8)\eta \mu x$$

**15.8 10)**

$$\left[ \left( 3e^x - \frac{5}{x} \right) \ln x - (x^3 - x) \eta \mu x \right]' =$$

$$= \left( 3e^x - \frac{5}{x} \right)' \ln x + \left( 3e^x - \frac{5}{x} \right) (\ln x)' - (x^3 - x)' \eta \mu x - (x^3 - x)(\eta \mu x)' =$$

$$= \left( 3e^x + \frac{5}{x^2} \right) \ln x + \left( 3e^x - \frac{5}{x} \right) \frac{1}{x} - (3x^2 - 1) \eta \mu x - (x^3 - x)(\sigma v v x)$$

**15.8 11)**

$$[(\varepsilon \varphi x - \sigma \varphi x) \sqrt{x} - (x^5 - 2x) \sigma v v x]' =$$

$$= (\varepsilon \varphi x - \sigma \varphi x)' \sqrt{x} + (\varepsilon \varphi x - \sigma \varphi x) (\sqrt{x})' - (x^5 - 2x)' \sigma v v x - (x^5 - 2x)(\sigma v v x)' =$$

$$= \left( \frac{1}{\sigma v v^2 x} + \frac{1}{\eta \mu^2 x} \right) \sqrt{x} + (\varepsilon \varphi x - \sigma \varphi x) \frac{1}{2\sqrt{x}} - (5x^4 - 2) \sigma v v x + (x^5 - 2x) \eta \mu x =$$

$$= \frac{\sqrt{x}}{\sigma v v^2 x} + \frac{\sqrt{x}}{\eta \mu^2 x} + \frac{\varepsilon \varphi x - \sigma \varphi x}{2\sqrt{x}} - (5x^4 - 2) \sigma v v x + (x^5 - 2x) \eta \mu x$$

**15.8 12)**

$$\left( \frac{x^5}{5} - 8x^3 \ln x \right)' = \left( \frac{x^5}{5} \right)' - (8x^3 \ln x)' = \frac{5x^4}{5} - (8x^3)' \ln x - 8x^3 (\ln x)' =$$

$$= x^4 - 24x^2 \ln x - 8x^3 \frac{1}{x} = x^4 - 24x^2 \ln x - 8x^2$$

**15.8 13)**

$$\left[ 6\varepsilon \varphi x + \left( \frac{x^2}{3} - 1 \right) \sqrt{x} \right]' = (6\varepsilon \varphi x)' + \left[ \left( \frac{x^2}{3} - 1 \right) \sqrt{x} \right]' =$$

$$= \frac{6}{\sigma v v^2 x} + \left( \frac{x^2}{3} - 1 \right)' \sqrt{x} + \left( \frac{x^2}{3} - 1 \right) (\sqrt{x})' = \frac{6}{\sigma v v^2 x} + \frac{2x}{3} \sqrt{x} + \left( \frac{x^2}{3} - 1 \right) \frac{1}{2\sqrt{x}}$$

$$\begin{aligned}
& \left[ \left( \frac{x^4}{4} - 3x \right) 7^x + 5\sigma\varphi x \right]' = \left[ \left( \frac{x^4}{4} - 3x \right) 7^x \right]' + (5\sigma\varphi x)' = \\
& = \left( \frac{x^4}{4} - 3x \right)' 7^x + \left( \frac{x^4}{4} - 3x \right) (7^x)' - \frac{5}{\eta\mu^2 x} = \left( \frac{4x^3}{4} - 3 \right) 7^x + \left( \frac{x^4}{4} - 3x \right) 7^x \ln 7 - \frac{5}{\eta\mu^2 x} = \\
& = (x^3 - 3) 7^x + \left( \frac{x^4}{4} - 3x \right) 7^x \ln 7 - \frac{5}{\eta\mu^2 x}
\end{aligned}$$

## 15.8 15)

$$\begin{aligned}
& \left[ \frac{1}{x} \sigma\varphi x - \left( \frac{x^3}{3} - \ln x \right) \eta\mu x \right]' = \\
& = \left( \frac{1}{x} \right)' \sigma\varphi x + \frac{1}{x} (\sigma\varphi x)' - \left( \frac{x^3}{3} - \ln x \right)' \eta\mu x - \left( \frac{x^3}{3} - \ln x \right) (\eta\mu x)' = \\
& = -\frac{1}{x^2} \sigma\varphi x - \frac{1}{x} \frac{1}{\eta\mu^2 x} - \left( \frac{\cancel{\beta}x^2}{\cancel{\beta}} - \frac{1}{x} \right) \eta\mu x - \left( \frac{x^3}{3} - \ln x \right) \sigma\psi v x = \\
& = -\frac{\sigma\varphi x}{x^2} - \frac{1}{x\eta\mu^2 x} - \left( x^2 - \frac{1}{x} \right) \eta\mu x - \left( \frac{x^3}{3} - \ln x \right) \sigma\psi v x
\end{aligned}$$