

3. א.

$$f(x) = \frac{1}{3} \ln^3 x + \frac{1}{4} \ln^4 x, \quad x > 0$$

ב.

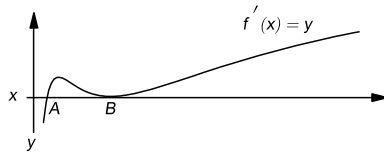
$$f'(x) = \frac{1}{3} \cdot 3 \ln^2 x \cdot \frac{1}{x} + \frac{1}{4} \cdot 4 \ln^3 x \cdot \frac{1}{x} = \frac{\ln^2 x + \ln^3 x}{x} = \frac{\ln^2 x (1 + \ln x)}{x} \stackrel{?}{=} 0$$

$$\ln x = 0 \Rightarrow x_1 = e^0 = 1, \quad 1 + \ln x = 0 \Rightarrow \ln x = -1 \Rightarrow x_2 = e^{-1} = \frac{1}{e}$$

x	0		$\frac{1}{e}$		1	
f'		$\frac{+-}{+} = -$	0	$\frac{++}{+} = +$	0	$\frac{++}{+} = +$
f		↘	min	↗	פיתול	↗

$$f\left(\frac{1}{e}\right) = \frac{1}{3} \cdot (-1)^3 + \frac{1}{4} \cdot (-1)^4 = \frac{1}{4} - \frac{1}{3} = -\frac{1}{12} \Rightarrow \min\left(\frac{1}{e}, -\frac{1}{12}\right)$$

ג.



⇒

x	0		A		B	
f'		-	0	+	0	+
f		↘	min	↗	פיתול	↗

$$\Rightarrow A\left(\frac{1}{e}, 0\right), \quad B(1, 0)$$

