الجامعة اللبنانية

كلية الصحة العامة

مباراة الدخول 2020 –2021

مسابقة في الرياضيات

المدة : ٤٥ دقيقة   عدد الصفحات: ١

For each question, circle the correct answer. (Only one answer is correct)

1) Let f be the function defined by: $f(x) = ln(x^2 + 5x + 6)$. The domain of f is :

a) $]-\infty; -3] \cup [-2; +\infty[$ **b)** $]-3; -2[$ **c)** $]-2; 1[$ **d)** $]-\infty; -3[\cup]-2; +\infty[$

2) Let f be the function defined by: $f(x) = ln\left(\frac{e^x+1}{2e^x+3}\right)$. Then $\lim_{x\to+\infty} f(x) =$

a) $-ln2$ **b)** $ln2$ **c)** $-ln3$ **d)** $ln3$

3) The derivative of $f(x) = e^x - \frac{2e^x}{x+1}$ is:

a) $-e^x$ **b)** $\frac{(x^2+1)e^x}{(x+1)^2}$ **c)** $e^x - \frac{2e^x}{(x+1)^2}$ **d)** $e^x - \frac{1}{(x+1)^2}$

4) $\int \left(e^{5x} - \frac{1}{x}\right) dx =$

a) $\frac{1}{5}e^{5x} - \ln|x| + C$ **b)** $5e^{5x} - \ln|x| + C$ **c)** $\frac{1}{5}e^{5x} - x^{-2} + C$ **d)** $\frac{1}{5}e^{5x} - (lnx)^2 + C$

5) Let f be the function defined by: $f(x) = lnx + e^{-x}$. The equation of the tangent to the curve of f at the point of abscissa 1 is:

a) $y = e^{-1}x + 2e^{-1}$ **b)** $y = (1 - e^{-1})x + 2e^{-1} - 1$

c) $y = (1 - e^{-1})x - 1$ **d)** $y = (1 - e^{-1})x + 2e^{-1}$

6) Let $f(x) = \frac{e^x}{e^x - 1}$. Then the curve of f admits:

a) 0 asymptote **b)** 1 asymptote **c)** 2 asymptotes **d)** 3 asymptotes.

7) Let f be the function defined by: $f(x) = a(lnx) - x$, where $a > 0$. Then the function f admits:

a) a local minimum at the point of abscissa a. **b)** a local minimum at the point of abscissa $1/a$.

c) a local maximum at the point of abscissa a. **d)** a local maximum at the point of abscissa $1/a$.

8) Let f be the function defined by: $f(x) = 2x - e^{-x} + 2$. Then the function f:

a) is strictly increasing over IR. **b)** is strictly decreasing over IR.

c) admits a local minimum. **d)** admits a local maximum.

9) Let f be the function defined by: $f(x) = \frac{1+x}{x^2+2x+5}$. An antiderivative of f is:

a) $\frac{\frac{1}{2}x^2+x}{\frac{1}{3}x^3+x^2+5x}$ **b)** $\frac{1}{2}ln(x^2 + 2x + 5)$ **c)** $ln(x^2 + 2x + 5)$ **d)** $\frac{1}{2x+2}$

10) The function $f(x) = x^2 - 3e^{-x} + \ln(x+1)$ admits a root α. Then $\alpha \in$

a) $]0,6 ; 0,7[$ **b)** $]0,7 ; 0,8[$ **c)** $]0,8 ; 0,9[$ **d)** $]0,9 ; 1[$