Please print your name clearly:...

Multiple Choice Part

Part **D**: Differentiation.

Evaluate the derivative of each of the following functions **at the point** $x = 0$, and choose the correct answer from the a)-d) group provided:

D1) $f(x) = x^3 + x^2 + 2x + 1$

Answer: a). 0;   b). 1;   c). 2 ;   d). none of the above

D2) $f(x) = \arctan(x) + x + 1$

Answer: a). 0;   b). 1;   c). 2 ;   d). none of the above

D3) $f(x) = \sin^2 x$

Answer: a). 0;   b). 1 ;   c). 2 ;   d). none of the above

D4) $f(x) = -e^{-x}$

Answer: a). -1;   b). 1 ;   c). e ;   d). none of the above

D5) $f(x) = \dfrac{x}{x^3 + 1}$

Answer: a). 0;   b). 1 ;   c). 2 ;   d). none of the above

D6) $f(x) = -\arcsin x + x + 1$

Answer: a). 0;   b). 1;   c). -1 ;   d). none of the above

D7) $f(x) = \dfrac{x^4 - 1}{x - 1}$

Answer: a). 0;   b). 1;   c). -1 ;   d). none of the above

D8) $f(x) = (x + e) \cdot \ln(x + e)$

Answer: a). 0;   b). 1;   c). 2 ;   d). none of the above

D9) $f(x) = xe^x$

Answer: a). 0;   b). 1;   c). e ;   d). none of the above

D10) $f(x) = \tan x$

Answer: a). 0;   b). 1;   c). 2 ;   d). none of the above

Part **I**: Integration.

Evaluate the following definite integrals, and choose the correct answer from the a)-d) group provided:

I1) $\int_0^\pi \cos(2x)\, dx$

Answer: a). 0;   b). 1;   c). 2 ;   d). none of the above

I2) $\int_0^1 (3x^2 + 2x + 1)\, dx$

Answer: a). 1;   b). 2;   c). 3 ;   d). none of the above

I3) $\int_0^1 3x^2 \cdot e^{x^3}\, dx$

Answer: a). 0;   b). e;   c). $e - 1$;   d). none of the above

I4) $\int_0^{\pi/4} \sec^2 x\, dx$

Answer: a). 0;   b). 1;   c). 2 ;   d). none of the above

I5) $\int_0^1 \frac{1}{1 + x^2}\, dx$

Answer: a). 0;   b). π;   c). $\pi/4$;   d). none of the above

I6) $\int_0^1 \frac{1 + 2x}{1 + x + x^2}\, dx$

Answer: a). 0;   b). $\ln 2$;   c). $\ln 3$;   d). none of the above

I7) $\int_0^{\pi/2} \cos x\, dx$

Answer: a). 0;   b). 1;   c). 2 ;   d). none of the above

I8) $\int_{\pi/4}^{\pi/2} \cot x\, dx$

Answer: a). 0;   b). $\ln 2$;   c). 1 ;   d). none of the above

I9) $\int_e^{e^2} \frac{1}{x}\, dx$

Answer: a). 1;   b). 1.5;   c). 2 ;   d). none of the above

I10) $\int_1^9 \frac{1}{2\sqrt{x}}\, dx$

Answer: a). 0;   b). 1;   c). 2 ;   d). none of the above

Show Work Problems

I). Evaluate the following limits, if they exist. Box your final answers.

(i) $\lim\limits_{x \to 1} \dfrac{x^3 - 1}{x - 1} =$

(ii) $\lim\limits_{x \to \infty} (x)^{\frac{1}{x}} =$

II). (Rubric Assessment Problem)

A farmer wants to put a fence around a vegetable garden. Only three sides must be fenced, since a wall will form the fourth side. If he uses 80 m of fencing, what is the maximum area possible? For what dimensions will this area be maximized?

Use the remaining space on this page to work out Problem II. (You may use the back of this sheet in order to work out the multiple-choice problems.)