

TEST 2

REVISION QUESTIONS

Differentiation

① Differentiate the following:

a) $y = -2x^{-1/3}$

b) $y = 2\pi + 3e^{-4x}$

c) $y = e^{-2x} \ln(4x)$

d) $y = \frac{2x^3 + 3}{e^x}$

e) $y = \frac{4 \ln(x)}{\sin x}$

f) $y = \sin x e^x \ln(x)$

② Find all local max/min of

$$y = x^3 - 5x^2 + 4x$$

Integration

① Integrate the following

a) $y = 2 + \frac{1}{\sqrt{x}}$

b) $y = 4e^{-x} - 2$

c) $y = x \cos x$

d) $y = x \ln(x)$

② Find the following

a) $\int_0^2 Ax^2 - 2x \, dx$

b) $\int_0^{\infty} 3e^{-x} + 2e^{-2x} \, dx$

c) $\int_0^1 xe^x \, dx$

Vectors

$$\text{If } \underline{a} = \begin{pmatrix} 1 \\ 0 \\ 3 \end{pmatrix} \quad \underline{b} = \begin{pmatrix} -1 \\ -1 \\ 2 \end{pmatrix} \quad \underline{c} = \begin{pmatrix} -5 \\ 5 \\ -5 \end{pmatrix}$$

Find the following

a) $|\underline{a}|$

b) $\underline{a} - 2\underline{b} + 3\underline{c}$

c) $|\underline{b} + 2\underline{a}|$

d) $\underline{b} \cdot \underline{c}$

e) The angle between \underline{a} and \underline{c}

f) Write \underline{b} in terms of \underline{i} , \underline{j} , \underline{k}

g) Write down an equation for the plane containing A, B, C (the points located by \underline{a} , \underline{b} , \underline{c})