

Note : 1- Answer only five questions

2- All questions carry equal marks

Q1/ Evaluate the integrals by using the techniques of integration :- (choose only two)

1- $\int \frac{3x+2}{\sqrt{1-x^2}} dx$

2- $\int \frac{6x+7}{(x+2)^2} dx$

3- $\int e^x \cos x dx$

Q2/ Find the limits :- (choose only two)

1- $\lim_{x \rightarrow 0} \left(\frac{\sqrt{x^2+100}-10}{x^2} \right)$

2- $\lim_{x \rightarrow \infty} \left(\frac{5x^2+8x-3}{3x^2+2} \right)$

3- $\lim_{x \rightarrow 0} \left(\frac{\sin 2x}{5x} \right)$

Q3/ Water runs into a conical tank at the rate of 9 ft³/min . The tank stands point down and has a height of 10 ft and a base radius of 5 ft. How fast is the water level rising when the water is 6 ft deep?

Q4/ Find the volume of the solid generated by revolving the region bounded by $y = \sqrt{x}$ and the lines $y = 1$, $x = 4$ about the line $y = 1$.

Q5/ Find the derivatives: (choose only two)

1- $\log_{10}(3x+1)$

2- $y = \frac{(x^2+1)(x+3)^{\frac{1}{2}}}{x-1}$

3- $y = \ln(x^2+4) - x \tan^{-1} \left(\frac{x}{2} \right)$

Q6/ Find an equation for the line perpendicular to the tangent to the curve
 $y = x^3 - 4x + 1$ at the point (2 , 1) .

Good Luck

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