

1	Use trapezium rule with 5 strips to evaluate $\int_0^{\frac{\pi}{2}} \frac{1}{1+\sin x} dx$, correct to four decimal places.	05marks												
2	(a) Use the trapezium rule with 6 ordinates to estimate the value of $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \tan x dx$, correct to 3 significant figures. (b) (i) Calculate the percentage error in your estimation in (a) above . (ii) suggest how the percentage error above may be reduced.	06marks 06marks												
3	The table below is an extract from the tables of $\cos x^\circ$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>$x = 80^\circ$</td> <td>0'</td> <td>10'</td> <td>20'</td> <td>30'</td> <td>40'</td> </tr> <tr> <td>$\cos x$</td> <td>0.1736</td> <td>0.1708</td> <td>0.1679</td> <td>0.1650</td> <td>0.1622</td> </tr> </tbody> </table> Use linear interpolation to estimate (a) $\cos 80^\circ 36'$ (b) $\cos^{-1} 0.1685$	$x = 80^\circ$	0'	10'	20'	30'	40'	$\cos x$	0.1736	0.1708	0.1679	0.1650	0.1622	05marks
$x = 80^\circ$	0'	10'	20'	30'	40'									
$\cos x$	0.1736	0.1708	0.1679	0.1650	0.1622									
4	Show that the equation $\ln x = 2 - x$ has a root between $x = 1$ and $x = 2$. Hence use linear interpolation only once to find the root correct to 2 decimal places.	05marks												
5	A cylindrical pipe has a radius of 2.5cm measured to the nearest unit. If the absolute relative error in calculating its volume is 0.125, find the absolute relative error in measuring its height;	05marks												
6	(a) Given that Δx and Δy are the errors made in approximating x and y to given numbers of decimal places respectively respectively. Show that the maximum absolute error in $\frac{y}{x^2}$ is $2 \left \frac{y\Delta x}{x^3} \right + \left \frac{\Delta y}{x^2} \right $. (b) hence find the (i) limits within which the exact value of $\frac{0.74}{1.6^2}$ (ii) percentage error made in $\frac{0.74}{1.6^2}$. give your answers to 3sf	12marks												