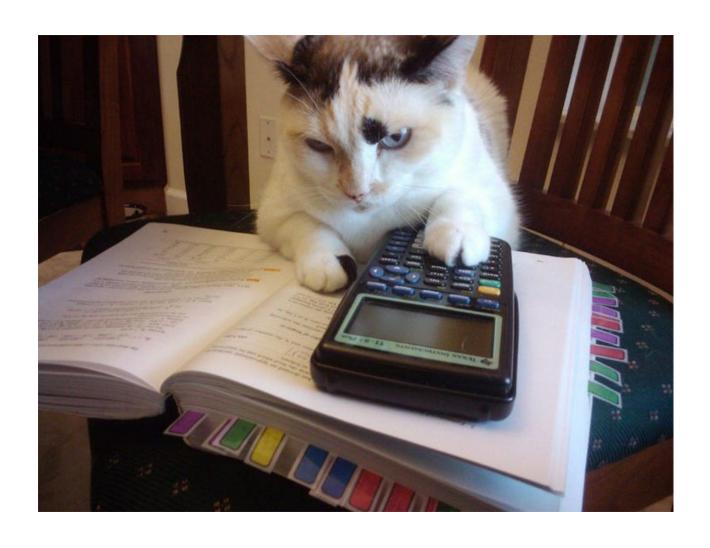
Speshlist Mathematics

IA3 Exam Worked Examples



1 Geometric Proofs using vectors

Example 4.5: Prove the diagonals of a parallelogram meet ar right angles if and only if it is a rhombus.		

2 Integration and applications of integration

Example 11.14: Evaluate the following: (a) $\int \cos^2 x dx$	(c) $\int \sin(2x)\cos(2x)dx$	(e) $\int \sin^3 x \cos^2 x dx$
(b) $\int \tan^2 x \ dx$	$(d) \int \cos^4 x \ dx$	

Example 11.24:
Example 11.24: Determine $\int x^2 e^x dx$.

3 Vector calculus

Example 8.19:

For position vectors at time $t \geq 0$, particles A and B are given by

$$r_A(t) = (t^3 - 9t + 8)\mathbf{i} + t^2\mathbf{j}$$

 $r_B(t) = (2 - t^2)\mathbf{i} + (3t - 2)\mathbf{j}$

Prove that A and B will collide while travelling at the same speed but at right angles to each other.