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| **Topic 1: Numbers and Algebra** | **Binomial Expansion**  |
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| 1. (a) Expand and simplify $\left(1-b\right)^{3} $in ascending powers of *b*.   (b) By using a suitable substitution for *b*, show that $1-3sin^{2}x+3sin^{4}x- sin^{6}x= cos^{6}x$  |  (2 marks) (3 marks)  |
|   Mark scheme:1. (a) $\left(1-b\right)^{3}$ An attempt to use the binomial theorem or simply multiplying $\left(1-b\right)^{3}=1- 3b+ 3b^{2}- b^{3}$ (b) $If b= sin^{2}x$ $1- 3sin^{2}x+ 3sin^{4}x- sin^{6}x= \left(1-sin^{2}x\right)^{3}$ $\left(1-sin^{2}x\right)^{3}= \left(cos^{2}x\right)^{3}$ $\left(cos^{2}x\right)^{3}= cos^{6}x$ |   (M1) (A1) (A1) (M1) (A1) |