$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

- (a) (i) Write down an expression for tan(2x) in terms of tan x
 - (ii) Hence show that $\tan(3x) = \frac{3\tan x \tan^3 x}{1 3\tan^2 x}$

(6)

Given that α is the acute angle such that $\cos \alpha = \frac{1}{3}$

(b) find the exact value of $\tan \alpha$

(2)

(c) Hence use the identity in part (a) to find the exact value of $tan(3\alpha)$

Give your answer in the form $\frac{a\sqrt{2}}{b}$ where a and b are integers.

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| (Total for Question 4 is 10 marks) |

