3. The continuous random variable X has cumulative distribution function given by

$$F(x) = \begin{cases} 0 & x < 0 \\ \frac{1}{6}x(x+1) & 0 \leqslant x \leqslant 2 \\ 1 & x > 2 \end{cases}$$

(a) Find the value of a such that $P(X > a) = 0.4$
Give your answer to 3 significant figures.

(3)

(b) Use calculus to find

(i) $E(X)$

(ii) $Var(X)$

(*Solutions relying on calculator technology are not acceptable.*)

(8)

(Total for Question 3 is 11 marks)

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4. A company claims that 35% of its peas germinate. In order to test this claim Ann decides to plant 15 of these peas and record the number which germinate.

(a) (i) State suitable hypotheses for a two tailed test of this claim.

(ii) Using a 5% level of significance, find an appropriate critical region for this test. The probability in each of the tails should be as close to 2.5% as possible.

(4)

(b) Ann found that 8 of the 15 peas germinated. State whether or not the company's claim is supported. Give a reason for your answer.

(2)

(c) State the actual significance level of this test.

(1)

(Total for Question 4 is 7 marks)