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| **MATHEMATICS DEPARTMENT**  **Year 12 Methods - Test Number 3 - 2016  Integration and the Binomial Distribution**  **Resource Rich** |

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Marks: 53**

**Time Allowed: 30 minutes**

**Instructions:** You are allowed to use Calculators and have 1 page of notes (2 sides).

You have been supplied with a formula sheet.

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1 The probability that a person currently in an Australian high security prison for committing a serious crime will reoffend within three years of release is known to be 0.68. Ten prisoners are randomly selected from a high security prison. Find the probability that at least four will reoffend within three years of their release.

[4 marks]

2 A binomial variable, X, has the probability function:

P(X = x) = (0.45)x(0.55)6 − x.

Find:

a the number of trials

b the probability of success in any trial

c the probability distribution as a table.

[1,2,3=6 marks]

3 A keen archer knows that she scores a bullseye one in every four shots.

a If she has 7 shots at the target, what is the probability she hits the bullseye at least twice?

b How many shots will she need to take in order to ensure a probability of more than 0.9 of scoring at least one bullseye?

[2,3 = 5 marks]

4 Evaluate each of the following definite integrals:

a 

b 

c 

d 

[3,3,3,3=12 marks]

5 a Evaluate .

b Find the area enclosed between the curve y = 2x3 and the x-axis between x = –3 and x = 3.

[2,4=6 marks]

6 Evaluate:



[3 marks]

7 Evaluate the following:

a 

b 

c 

[2,2,2=6 marks]

8 Find y in terms of x if  = 8x − 7 and y = 13 when x = −1.

[3 marks]

9 Find the area under the curve y = x2 − 4x − 12 from x = −1 to x = 4.

[4 marks]

10 Fluid flows into a storage tank at the rate

F′(t) = 100e0.2t litres/h

where t is measured in hours.

How much fluid, to the nearest litre, will flow into the tank in the first 3 hours?

[4 marks]

\*\*\*END OF RR TEST\*\*\*

Additional Working Space