MATHEMATICS DEPARTMENT

Year 12 Methods - Test Number 3 - 2016
Integration and the Binomial Distribution

Resource Free

Name: _____ **Teacher:** _____

Marks: **21**

Time Allowed: **15 minutes**

Instructions: You are NOT allowed ANY Calculators or notes.

You have been supplied with a formula sheet.

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1 Which statement is *not* true?

A $\int_a^b f(x)dx + \int_b^c f(x) = \int_a^c f(x)dx$

B $\int_a^b kf(x)dx = k\int_a^b f(x)dx$

C $\int_b^a f(x)dx = \int_a^b f(x)dx$

D $\int_a^b f(x)dx + \int_a^b g(x)dx = \int_a^b [f(x) + g(x)]dx$

E $\int_a^b f(x)dx - \int_a^b g(x)dx = \int_a^b [f(x) - g(x)]dx$

[2 marks]

2 An approximation to $\int_0^2 x^3 dx$ using 10 centred rectangles is given by:

A $0.2 \times [0^3 + 0.2^3 + 0.4^3 + 0.6^3 + 0.8^3 + 1^3 + 1.2^3 + 1.4^3 + 1.6^3 + 1.8^3]$

B $0.2 \times [0.2^3 + 0.4^3 + 0.6^3 + 0.8^3 + 1^3 + 1.2^3 + 1.4^3 + 1.6^3 + 1.8^3 + 2^3]$

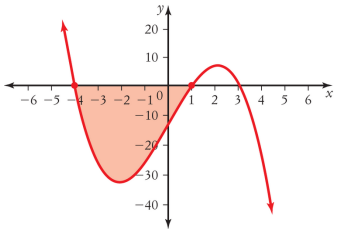
C $0.1 \times [0.1^3 + 0.3^3 + 0.5^3 + 0.7^3 + 0.9^3 + 1.1^3 + 1.3^3 + 1.5^3 + 1.7^3 + 1.9^3]$

D $0.2 \times [0.1^3 + 0.3^3 + 0.5^3 + 0.7^3 + 0.9^3 + 1.1^3 + 1.3^3 + 1.5^3 + 1.7^3 + 1.9^3]$

E $0.2 \times [0.25^3 + 0.5^3 + 0.75^3 + 1^3 + 1.25^3 + 1.5^3 + 1.75^3 + 2^3]$

[2 marks]

3 The area of the figure below is given by:



A $\int_{-4}^{0} f(x)dx + \int_{0}^{1} f(x)dx$

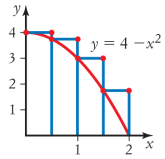
B $\int_{-4}^{1} f(x)dx$

C $\int_{-4}^{0} f(x)dx - \int_{0}^{1} f(x)dx$

D $-\int_{-4}^{0} f(x)dx + \int_{0}^{1} f(x)dx$

E $-\int_{-4}^{1} f(x)dx$ **[2 marks]**

4 Which statement would find the approximate area under the curve $y = 4 - x^2$ using the rectangles below.



A $0.5 \times [4 - 0^2 + 4 - 0.5^2 + 4 - 1^2 + 4 - 1.5^2]$

B $0.5 \times [0^2 + 0.5^2 + 1^2 + 1.5^2]$

C $0.5 \times [0.5^2 - 4 + 1^2 - 4 + 1.5^2 - 4 + 2^2 - 4]$

D $0.5 \times [4 - 0.5^2 + 1^2 + 1.5^2 + 2^2]$

E $0.5 \times [4 - 0.5^2 + 4 - 1^2 + 4 - 1.5^2 + 4 - 2^2]$ **[2 marks]**

5 The value of the definite integral $\int_{0}^{\frac{\pi}{6}} \sin(x)dx$ is:

A $-\frac{\sqrt{3}}{2}$

B $\frac{2-\sqrt{3}}{2}$

C $\frac{\sqrt{3}-2}{2}$

D $\frac{1}{2}$

E $-\frac{1}{2}$

[2 marks]

6 $\int_0^2 [5f(x) + 3]dx$ =

A $\int_0^2 f(x)dx + 3x$

B $5\int_0^2 f(x)dx + 3x$

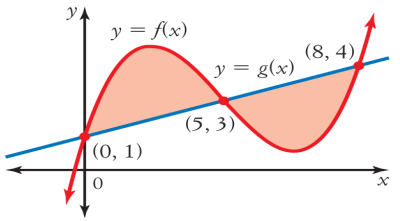
C $5f'(x) + 3$

D $5\int_0^2 f(x)dx + 6$

E $5\int_0^2 f(x)dx + x$

[2 marks]

7 The shaded area below can be written as:



A $\int_0^5 f(x) - g(x)dx - \int_5^8 g(x) - f(x)dx$

B $\int_0^8 f(x) - g(x)dx$

C $\int_0^5 f(x) - g(x)dx + \int_5^8 g(x) - f(x)dx$

D $\int_1^3 f(x) - g(x)dx + \int_3^4 g(x) - f(x)dx$

E $\int_1^3 f(x) - g(x)dx - \int_3^4 g(x) - f(x)dx$

[2 marks]

8 $\int_0^4 (6\sqrt{x} - x)dx$ =

A 64

B 48

C 40

D 24

E 12

[2 marks]

9 If the derivative of e^{x^2-6x} is $2(x-3)\ e^{x^2-6x}$, then the antiderivative of $(x-3)e^{x^2-6x}$ is:

A $2e^{x^2-6x} + c$

B $\frac{1}{2}(x-3)\ e^{x^2-6x}$

C $e^{x^2-6x} + c$

D $2(x-3)\ e^{x^2-6x}$

E $\frac{1}{2}e^{x^2-6x} + c$ **[2 marks]**

10 Find the exact probability that when a six-sided die is rolled four times a number less than 5 occurs on exactly two occasions.

[3 marks]

Additional Working Space Below:

*****END OF RF TEST*****