United Arab Emirates Ministry of Education Beda Al Mutawa School		دولة الإمارات العربية المتحدة وزارة التربية والتعليم مدرسة بدع المطاوعة

Grade: 12 Advanced (عشر متقدم)	Subject: Mathematics (الرياضيات)	Teacher: Mr. Abdulkader Amro

Question 11

Find the general antiderivative: $\int (2\sin x + \cos x)\,dx$

- A) $2\cos x - \sin x + C$
- B) $-2\cos x + \sin x + C$
- C) $-2\cos x - \sin x + C$
- D) $2\sin x + \cos x + C$

Question 12

Find the general antiderivative: $\int (3\cos x - \sin x)\,dx$

- A) $3\sin x + \cos x + C$
- B) $3\sin x - \cos x + C$
- C) $-3\sin x + \cos x + C$
- D) $-3\cos x - \sin x + C$

Question 13

Find the general antiderivative: $\int 2\sec x \tan x\,dx$

- A) $2\tan x + C$
- B) $2\sec^2 x + C$
- C) $2\sec x + C$
- D) $\sec x \tan x + C$

Question 14

Find the general antiderivative: $\int \frac{4}{\sqrt{1-x^2}}\,dx$

- A) $4\tan^{-1} x + C$
- B) $4\sin^{-1} x + C$
- C) $4\ln|1 - x^2| + C$
- D) $-4\cos^{-1} x + C$

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Question 15

Find the general antiderivative: $\int 5\sec^2 x\,dx$

- A) $5\tan x + C$
- B) $5\sec x + C$
- C) $-5\cot x + C$
- D) $5\sec x\tan x + C$

Question 16

Find the general antiderivative: $\int 4\frac{\cos x}{\sin^2 x}\,dx$

- A) $4\csc x + C$
- B) $-4\cot x + C$
- C) $-4\csc x + C$
- D) $4\ln|\sin^2 x| + C$

Question 17

Find the general antiderivative: $\int (3e^x - 2)\,dx$

- A) $3e^x - 2x + C$
- B) $3e^x + C$
- C) $\frac{3}{2}e^{2x} - 2x + C$
- D) $3e^x - 2 + C$

Question 18

Find the general antiderivative: $\int (4x - 2e^x)\,dx$

- A) $4 - 2e^x + C$
- B) $2x^2 - 2e^x + C$
- C) $4x^2 - e^x + C$
- D) $2x^2 - e^x + C$

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Question 19

Find the general antiderivative: $\int (3\cos x - 1/x)\,dx$

- A) $3\sin x - \ln|x| + C$
- B) $-3\sin x - \ln|x| + C$
- C) $3\sin x + \frac{1}{x^2} + C$
- D) $3\cos x - \ln|x| + C$

Question 20

Find the general antiderivative: $\int (2x^{-1} + \sin x)\,dx$

- A) $-2x^{-2} - \cos x + C$
- B) $2\ln|x| + \cos x + C$
- C) $2\ln|x| - \cos x + C$
- D) $x^0 - \cos x + C$

Question 9

Use summation rules to compute the sum:

$$\sum_{i=1}^{70} (3i - 1)$$

- A) $7,385$
- B) $7,455$
- C) $7,525$
- D) $2,415$

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Question 10

Use summation rules to compute the sum:

$$\sum_{i=1}^{45}(3i-4)$$

- A) $3,105$
- B) $2,925$
- C) $3,015$
- D) $2,835$

Question 11

Use summation rules to compute the sum:

$$\sum_{i=1}^{40}(4-i^2)$$

- A) $-21,980$
- B) $-22,140$
- C) $-21,820$
- D) $-22,300$

Question 12

Use summation rules to compute the sum:

$$\sum_{i=1}^{50}(8-i)$$

- A) -875
- B) $-1,275$
- C) -400
- D) -925

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Question 1

According to Definition 4.1, which of the following expressions correctly defines the definite integral of a function $f(x)$ defined on the closed interval $[a, b]$?

- A) $\int_a^b f(x)\,dx = \sum_{i=1}^{n} f(c_i)\Delta x$
- B) $\int_a^b f(x)\,dx = \lim_{n\to\infty} \sum_{i=1}^{n} f(c_i)\Delta x$
- C) $\int_a^b f(x)\,dx = \lim_{n\to\infty} f(c_i)\Delta x$
- D) $\int_a^b f(x)\,dx = \sum_{i=1}^{n} \lim_{n\to\infty} f(c_i)\Delta x$

Question 2

What condition must be met for a function f to be considered **integrable** on the interval $[a, b]$?

- A) The limit of the Riemann sum must exist and yield a different value for different evaluation points.
- B) The function $f(x)$ must be equal to zero at all evaluation points c_i.
- C) The limit of the Riemann sum must exist and remain the same for every choice of evaluation points $c_1, c_2, \ldots, c_n$.
- D) The width of the subintervals Δx must approach infinity as n increases.

Question 3

In the given definite integral limit formula, what does the term $f(c_i)$ represent?

- A) The width of each individual subinterval on the x-axis.
- B) The total area under the curve from a to b.
- C) The number of approximating rectangles used in the partition.
- D) The value of the function (height of the rectangle) evaluated at a chosen point within the i-th subinterval.

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$$\int_1^3 f(x)\,dx = 3 \quad \text{and} \quad \int_1^3 g(x)\,dx = -2$$

Question 37 (a)

Find the value of the integral:

$$\int_1^3 [f(x) + g(x)]\,dx$$

- A) 5
- B) 1
- C) -1
- D) 6

Question 37 (b)

Find the value of the integral:

$$\int_1^3 [2f(x) - g(x)]\,dx$$

- A) 4
- B) 8
- C) 7
- D) 5

Question 38 (a)

Find the value of the integral:

$$\int_1^3 [f(x) - g(x)]\,dx$$

- A) 1
- B) -5
- C) 5
- D) -1

Question 38 (b)

Find the value of the integral:

$$\int_1^3 [4g(x) - 3f(x)]\,dx$$

- A) -17
- B) 1
- C) -1
- D) -5

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Question 49

Use a geometric formula to compute the definite integral:

$$\int_0^2 3x\,dx$$

- A) 3
- B) 6
- C) 12
- D) 4

Question 50

Use a geometric formula to compute the definite integral:

$$\int_1^4 2x\,dx$$

- A) 15
- B) 16
- C) 12
- D) 20

Question 51

Use a geometric formula to compute the definite integral:

$$\int_0^2 \sqrt{4-x^2}\,dx$$

- A) 4π
- B) 2π
- C) π
- D) $\frac{\pi}{2}$

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Question 52

Use a geometric formula to compute the definite integral:

$$\int_{-3}^{0} \sqrt{9 - x^2}\, dx$$

- A) $\frac{9\pi}{4}$
- B) 3π
- C) $\frac{9\pi}{2}$
- D) $-\frac{9\pi}{4}$

Question 7 (From Image 33)

Find the value of c that satisfies the conclusion of the Integral Mean Value Theorem for:

$$\int_{0}^{2} 3x^2\, dx = 8$$

- A) $c = \sqrt{\frac{4}{3}}$
- B) $c = \frac{2}{\sqrt{3}}$
- C) $c = \sqrt{2}$
- D) $c = \frac{4}{3}$

Question 8 (From Image 34)

Find a value of c that satisfies the conclusion of the Integral Mean Value Theorem for:

$$\int_{-1}^{1} (x^2 - 2x)\, dx = \frac{2}{3}$$

- A) $c = 1 - \frac{2}{\sqrt{3}}$
- B) $c = 1 + \frac{2}{\sqrt{3}}$
- C) $c = \frac{1}{\sqrt{3}}$
- D) $c = -\frac{1}{\sqrt{3}}$

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Question 12 (Exercise 1)

Compute the definite integral exactly:

$$\int_0^2 (2x - 3)\, dx$$

- A) -2
- B) 2
- C) 0
- D) -4

Question 13 (Exercise 2)

Compute the definite integral exactly:

$$\int_0^3 (x^2 - 2)\, dx$$

- A) 9
- B) 3
- C) 6
- D) 0

Question 14 (Exercise 3)

Compute the definite integral exactly:

$$\int_{-1}^1 (x^3 + 2x)\, dx$$

- A) 2
- B) -2
- C) 0
- D) 1

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Question 15 (Exercise 4)

Compute the definite integral exactly:

$$\int_0^2 (x^3 + 3x - 1)\,dx$$

- A) 10
- B) 8
- C) 12
- D) 6

Question 16 (Exercise 5)

Compute the definite integral exactly:

$$\int_1^4 \left(x\sqrt{x} + \frac{3}{x}\right)\,dx$$

- A) $\frac{62}{5} + 3\ln 4$
- B) $\frac{64}{5} + \ln 4$
- C) $\frac{62}{5} - 3\ln 4$
- D) $12 + 3\ln 4$

Question 17 (Exercise 6)

Compute the definite integral exactly:

$$\int_1^2 \left(4x - \frac{2}{x^2}\right)\,dx$$

- A) 6
- B) 5
- C) 7
- D) 4