

الفصل الدراسي: الثاني ١٤٣١ / ١٤٣٢ هـ  
الدوري الاول  
التاريخ: ١٤٣٢ / ٥ / ٢ هـ.  
الزمن: 90 دقيقة  
المادة: تفاضل وتكامل (٢)  
رمزها : math 202

بسم الله الرحمن الرحيم

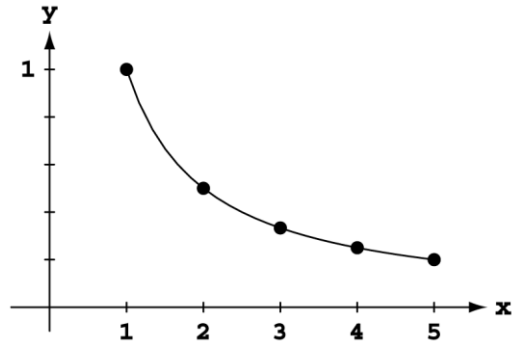


جامعة الملك عبد العزيز  
كلية العلوم  
قسم الرياضيات

|       |     |      |        |
|-------|-----|------|--------|
| Name: | ID: | S.N: | Group: |
|-------|-----|------|--------|

**Q1) Choose the correct answer:**

1. The lower sum with four rectangles of equal width of  $f(x) = \frac{1}{x}$  between  $x = 1$  and  $x = 5$  is



|                                                                    |                                                                              |                                                                |                                                      |
|--------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------|
| (A)<br>$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5}$ | (B)<br>$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6}$ | (C)<br>$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5}$ | (D)<br>$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}$ |
|--------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------|

|                         |                             |                             |                             |                            |
|-------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|
| 2. $\sum_{k=1}^4 k^2 =$ | (A)<br>$\frac{7(8)(15)}{6}$ | (B)<br>$\frac{6(7)(13)}{6}$ | (C)<br>$\frac{5(6)(11)}{6}$ | (D)<br>$\frac{4(5)(9)}{6}$ |
|-------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|

|                                                                           |          |           |           |           |
|---------------------------------------------------------------------------|----------|-----------|-----------|-----------|
| 3. Suppose that $\sum_{k=1}^5 a_k = 3$ , then $\sum_{k=1}^5 (2 + 2a_k) =$ | (A)<br>8 | (B)<br>16 | (C)<br>40 | (D)<br>22 |
|---------------------------------------------------------------------------|----------|-----------|-----------|-----------|

4. The sigma notation of  $1 + 2 + 4 + 8 + 16 + 32$  is

(A)

$$\sum_{k=1}^6 2^{k-1}$$

(B)

$$\sum_{k=1}^6 2^k$$

(C)

$$\sum_{k=1}^6 2^{k+1}$$

5. If  $1 \leq f(x) \leq 6$  for each  $x \in [1, 3]$  and  $f$  is continuous on  $[1, 3]$ , then

(A)

$$-1 \leq \int_1^3 f(x) dx \leq 1$$

(B)

$$0 \leq \int_1^3 f(x) dx \leq 1$$

(C)

$$\int_1^3 f(x) dx \leq -12$$

(D)

$$2 \leq \int_1^3 f(x) dx \leq 12$$

$$6. \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} x^9 \cos x \, dx =$$

(A)

$$-\frac{2\pi}{3}$$

(B)

$$\frac{3\pi}{2}$$

(C)

$$\frac{2\pi}{3}$$

(D)

$$0$$

7. If  $f$  is even,  $\int_1^4 f(x) dx = 7$ , and  $\int_0^1 f(x) dx = 2$ , then  $\int_{-4}^4 f(x) dx =$

(A)

$$14$$

(B)

$$9$$

(C)

$$0$$

(D)

$$18$$

$$8. \frac{d}{dx} \left( \int_0^{\tan x} \frac{1}{1+t^2} dt \right) =$$

(A)

$$1$$

(B)

$$-1$$

(C)

$$\cos^2 x$$

(D)

$$\sin^2 x \sec^2 x$$

$$9. \int \sec^2 \theta \sqrt{\tan \theta} \, d\theta =$$

(A)

$$\frac{2}{3} (\tan \theta)^{\frac{3}{2}} + c$$

(B)

$$\frac{1}{3} \sec^3 \theta + c$$

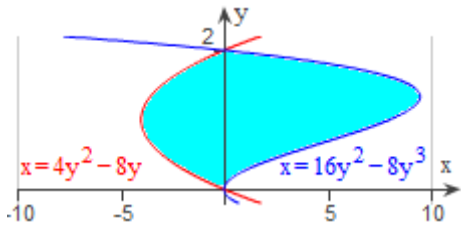
(C)

$$\tan \theta + c$$

(D)

$$\sec \theta + c$$

|                                      |                                 |                       |                      |
|--------------------------------------|---------------------------------|-----------------------|----------------------|
| 10. $\int \frac{1}{\sqrt{\pi}} dx =$ |                                 |                       |                      |
| (A) 0                                | (B) $\frac{1}{\sqrt{\pi}}x + c$ | (C) $2\sqrt{\pi} + c$ | (D) $\sqrt{\pi} + c$ |

|                                                                                               |           |
|-----------------------------------------------------------------------------------------------|-----------|
| 11. The area of the region between the curves of $x = 4y^2 - 8y$ and $x = 16y^2 - 8y^3$ is 16 |           |
|             |           |
| (A) TRUE                                                                                      | (B) FALSE |

|                                                                                    |        |        |         |
|------------------------------------------------------------------------------------|--------|--------|---------|
| 12. The length of the curve $x = 1 - 4t$ , $y = 2 + 3t$ from $t = 1$ to $t = 4$ is |        |        |         |
| (A) 3                                                                              | (B) 75 | (C) 15 | (D) -15 |

**Q 2. Integrate the following**

A.  $\int_{-1}^1 (2 + |x|) dx$

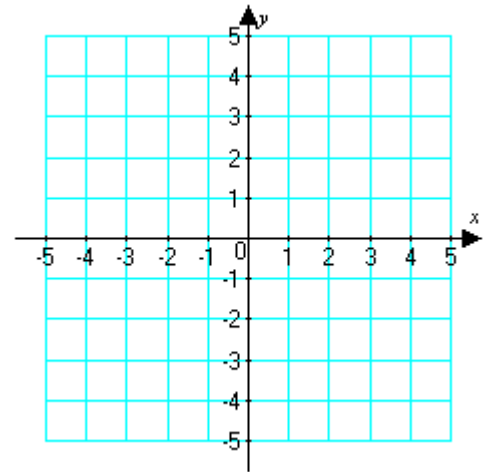
B.  $\int \frac{x}{x^3 + 2x^2 + x} dx$

C.  $\int_0^{\pi} \frac{\sin^2 x + \cos^2 x}{\csc x} dx$

$$D. \int \frac{2x + \sec^2 \sqrt{x}}{\sqrt{x}} dx$$

$$E. \int \sqrt[3]{x^3 - 1} \ x^5 dx$$

Q 3. Find The volume of the solid generated by revolving the region bounded by the line  $y = 2x$ ,  $y = 0$ , and  $x = 2$ , about the  $x=2$



Q4. Use the shell method to find the volume of the solid generated by revolving the region bounded by the curve  $y = x^2$  and the line  $y = x$  about the  $y$ -axis

