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KINGDOM OF SAUDI ARABIA
Ministry of Higher Education
Al-Imam Mohammed Ibn Saud Islamic University
College of Science and Preparatory Programs Deanship

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الإمام محمد بن سعود الإسلامية
كلية العلوم وعمادة البرامج التحضيرية

# FINAL EXAM(Complementary)

| **COURSE:** TRACK OF ECONOMIC & DMINSTARATIVE SCIENCE ( MATH 016 ) | | |
|---|---|---|
| **SEMESTER:** FIRST | **YEAR:** 1434/1435 | **DURATION:** 120 min |

| | | | |
|---|---|---|---|
| | الشعبة | نموذج ١ جاهز | الاسم |
| | التوقيع | | الرقم الجامعي |

## INSTRUCTIONS

1) The exam contains **06 Pages** total (including the first pages!!) and **05 QUESTIONS. EiCNOMICS**
2) NO book, NO notes, NO Calculator.

**Marking Scheme:**

| | SCORE |
|---|---|
| QUESTION 1 | /30 |
| QUESTION 2 | /20 |
| QUESTION 3 | /20 |
| QUESTION 4 | /20 |
| QUESTION 5 | /10 |
| TOTAL | /100 |

**Question 1:** (30 Marks) ) Choose the correct answer (**write your answers in the table below**) :

**[1].** The set of points $\{(-1,3),(2,3),(2,9),(0,5)\}$ is:

A) Not Function B) Function C) One-to-one D) None of them

**[2].** The ***domain*** of the function $f(x)=\frac{1-x}{x^2+1}$ is:

A) $R-\{-1,1\}$ B) $R-\{0,-1\}$ C) $R-\{1,1\}$ D) None of them

**[3].** The correct simplification for $\sqrt[3]{8x^6y^9}$ equal :

A) $2x^3y^6$ B) $2x^2y^3$ C) $2xy^2$ D) $2x^2y^6$

**[4].** The ***vertex*** of the function $f(x)=x^2-2x+3$ is:

A) $(-1,2)$ B) $(1,2)$ C) $(1,3)$ D) $(-1,3)$

**[5].** Let $f=\{(1,3),(2,0),(3,1),(-1,2)\}$, then $\boldsymbol{f(2)}$ equal:

A) 1 B) $-1$ C) 0 D) None of them

**[6].** The ***y-intercepts*** of the function $y=(x+1)^2+3$ equal:

A) 3 B) $-3$ C) $-4$ D) $+4$

**[7].** The value of $\log_2(64)$ equal:

A) $x=8$ B) $x=4$ C) $x=6$ D) None of them

**[8].** If $f(x)=3^{(x+1)}$, then $\boldsymbol{f(2)}$ equal:

A) 27 B) 9 C) $-9$ D) $\frac{-1}{9}$

**[9].** If $\begin{bmatrix}2x & 0\\ 3 & 1\end{bmatrix}=\begin{bmatrix}-6 & 0\\ 3 & y+1\end{bmatrix}$, then the value of $\boldsymbol{x}$ and $\boldsymbol{y}$ when are equal.

A) $x=-3,y=0$ B) $x=3,y=-2$ C) $x=-3,y=-2$ D) $x=3,y=2$

**[10].** If $A=\begin{bmatrix}4 & -1\\ -2 & 2\end{bmatrix}$, then $|A|$ equal:

A) 6 B) $-4$ C) 4 D) None of them

| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Answer | A | D | B | B | C | D | C | A | A | A |



every item (3) Marks

**Question 3:** (20 Marks)

Let $f(x) = \sqrt{x-1}$ and $g(x) = 2x + 1$. Find each of the following:

1) Domain $f(x)$

let $x - 1 \geq 0$ → 3

$x \geq 1$

Domain $= [1, \infty)$ → 2

2) $(f \cdot g)(1) = f(1) \cdot g(1)$ } → 3

$= \sqrt{1-1} \cdot (2 \cdot 1 + 1)$

$= 0 \cdot 3$ } → 2

$= \boxed{0}$

3) $(f \circ g)(2) = f(g(2))$ } → 3

$= f(2 \cdot 2 + 1)$

$= f(5)$ } → 2

$= \sqrt{5-1} = \boxed{2}$

4) $g^{-1}(x)$ → $g(x) = 2x + 1$

$y = 2x + 1$ } → 3

$x = 2y + 1$

$x - 1 = 2y$ (+2)

$\frac{x-1}{2} = y$ } 2

$\boxed{g^{-1}(x) = \frac{x-1}{2}}$

**Question 4:** (20 Marks) = 7+7+6

1) Let $A = \begin{bmatrix} 1 & 0 \\ -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$. Find each of the following:

a) $A + 2B$ $= \begin{bmatrix} 1 & 0 \\ -1 & 1 \end{bmatrix} + 2\begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$ → 3

$= \begin{bmatrix} 1 & 0 \\ -1 & 1 \end{bmatrix} + \begin{bmatrix} 2 & 4 \\ 0 & -2 \end{bmatrix}$ → 3

$= \begin{bmatrix} 1 & 4 \\ -1 & -1 \end{bmatrix}$ → 1

b) $AB$ $= \begin{bmatrix} 1 & 0 \\ -1 & 1 \end{bmatrix}\begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$ → 3

$= \begin{bmatrix} 1+0 & 2+0 \\ -1+0 & -2-1 \end{bmatrix}$ → 3

$= \begin{bmatrix} 1 & 2 \\ -1 & -3 \end{bmatrix}$ → 1

c) $A^{-1}$

$|A| = 1 - 0 = (1)$ → 2

$A^{-1} = \frac{1}{|A|}\begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ → 2

$= 1\begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$

$= \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ → 2

**Question 5:** (10 Marks)

Use Cramer's Rule to solve the system (Find only the value of $x$):

$$2x - y + z = 0$$
$$2x + y - 2z = -4$$
$$x + y - z = -3$$

$x = \frac{D_x}{D}$

$D = \begin{vmatrix} 2 & -1 & 1 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{vmatrix}$ $\begin{matrix} 2 & -1 \\ 2 & 1 \\ 1 & 1 \end{matrix}$

1 , -4 , 2 , -2 , 2 , 2

$D = (-2 + 2 + 2) - (1 - 4 + 2)$

$= 2 \quad + 1$

$D = 3$ → 4

$D_x = \begin{vmatrix} 0 & -1 & 1 \\ -4 & 1 & -2 \\ -3 & 1 & -1 \end{vmatrix}$ $\begin{matrix} 0 & -1 \\ -4 & 1 \\ -3 & 1 \end{matrix}$

-3 , 0 , -4 , 0 , -6 , -4

$D_x = (0 - 6 - 4) - (-3 + 0 - 4)$

$= -10 \quad + 7$

$= -3$

$\therefore x = \frac{D_x}{D} = \frac{-3}{3}$

$x = -1$ → 4 → 2

**Good Luck**

مع دعائنا لكم بالتوفيق