

**University of Bahrain
College of Science
Department of Mathematics
First Semester 2009/2010**

**Math A111
Final Exam**

Date: 14/01/2010

Time: 08:30 – 10:30 Ω

Max. Mark: 60

Coordinators: Prof. Shoukry Hassan & Dr. Thuraya Juma

Student Name:	
Student ID :	Section:
Your Instructor's Name:	

Write all your answers on Page 2.

Please check that you have 9 pages

Max. Marks :	60
Marks Obtained:	

☺ ☺ ☺ ☺ **GOOD LUCK** ☺ ☺ ☺ ☺

Answer Sheet Ω

Student Name:.....Student ID:.....Section:...

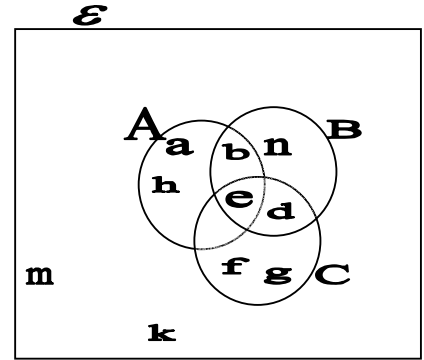
Each of the following questions counts 2 Marks

	a	b	c	d
Question 1				
Question 2				
Question 3				
Question 4				
Question 5				
Question 6				
Question 7				
Question 8				
Question 9				
Question 10				
Question 11				
Question 12				
Question 13				
Question 14				
Question 15				
Question 16				
Question 17				
Question 18				
Question 19				
Question 20				
Question 21				
Question 22				
Question 23				
Question 24				
Question 25				
Question 26				
Question 27				
Question 28				
Question 29				
Question 30				

Choose the correct answer and write it on the answer sheet on page 2

1. If $A = \{0, 1, 2, 3, 4, 5, 6, 7, 8\}$, $B = \{0, 3, 6, 9, 12\}$, $C = \{2, 4, 6, 8, 10, 12\}$, then $A \cap (B \cup C) =$
 a) $\{0, 2, 3, 4, 6, 8\}$ b) $\{0, 3, 6, 12\}$
 c) $\{0, 2, 3, 4, 6, 8, 9, 10, 12\}$ d) $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 12\}$

2. From the Venn diagram, $\overline{A \cup B}$
 a) $\{a, h, b, e, n, d\}$ b) $\{a, h, m, k\}$
 c) $\{f, g, m, k\}$ d) $\{m, k\}$



3. The simplification of $\frac{9(pq^4r^{-3})^2}{-3p^2q^7} =$
 a) $\frac{-3q}{r^6}$ b) $\frac{-3}{qr^6}$
 c) $\frac{-3q}{r^5}$ d) $-3qr^6$

4. The binary number 100100 in decimal system is equal
 a) 38 b) 34
 c) 32 d) 36

5. The expansion of $(2m - 3)(m^2 + m - 5) =$
 a) $2m^3 + 5m^2 + 7m + 15$ b) $2m^3 - m^2 - 13m + 15$
 c) $2m^3 + m^2 + 13m + 15$ d) $2m^3 - 5m^2 - 7m + 15$

6. The solutions of the equation $x^2 + 2x - 15 = 0$ are

- | | |
|---------------------|--------------------|
| a) $x = 5, x = 3$ | b) $x = -5, x = 3$ |
| c) $x = -5, x = -3$ | d) $x = 5, x = -3$ |

7. The solutions of the simultaneous equations $\begin{cases} x + 3y = 2 \\ -x + 2y = 3 \end{cases}$ are

- | | |
|---------------------|--------------------|
| a) $x = -1, y = -1$ | b) $x = 1, y = 1$ |
| c) $x = -1, y = 1$ | d) $x = 1, y = -1$ |

8. The solutions of the equation $x^2 - 7x + 3 = 0$ are

- | | |
|------------------------------------|-------------------------------------|
| a) $x = \frac{7 \pm \sqrt{37}}{2}$ | b) $x = \frac{-7 \pm \sqrt{37}}{2}$ |
| c) $x = \frac{7 \pm \sqrt{45}}{2}$ | d) $x = \frac{7 \pm \sqrt{61}}{2}$ |

9. The simplification of $\frac{5}{a+b} - \frac{4}{a-b} =$

- | | |
|-------------------------------|------------------------------|
| a) $\frac{-a-9b}{(a+b)(a-b)}$ | b) $\frac{a+9b}{(a+b)(a-b)}$ |
| c) $\frac{-a+9b}{(a+b)(a-b)}$ | d) $\frac{a-9b}{(a+b)(a-b)}$ |

10. The simplification of $\frac{10x}{x^2 + 3x} \div \frac{15x}{x^2 - x - 12} =$

- | | |
|------------------------|------------------------|
| a) $\frac{3x}{2(x-4)}$ | b) $\frac{2(x-4)}{3x}$ |
| c) $\frac{2(x+4)}{3}$ | d) $\frac{2(x+4)}{3x}$ |

11. If $f(t) = 2t + 1$ and $g(t) = 4t - 3$ then $g(f(2)) =$

a) 5

b) 23

c) 17

d) 20

12. If $f(x) = 7 - 3x$, then

a) $f^{-1}(x) = \frac{1}{7-3x}$

b) $f^{-1}(x) = \frac{7-x}{3}$

c) $f^{-1}(x) = \frac{3-x}{7}$

d) $f^{-1}(x) = -7 + 3x$

13. $\begin{pmatrix} -1 & 2 & 0 \\ 0 & 3 & 6 \end{pmatrix} - \begin{pmatrix} 0 & -4 & 3 \\ 9 & -4 & -3 \end{pmatrix} =$

a) $\begin{pmatrix} -1 & -2 & -3 \\ -9 & -1 & -3 \end{pmatrix}$

b) $\begin{pmatrix} -1 & -2 & 3 \\ 9 & 1 & -3 \end{pmatrix}$

c) $\begin{pmatrix} 1 & -6 & -3 \\ 9 & -7 & -9 \end{pmatrix}$

d) $\begin{pmatrix} -1 & 6 & -3 \\ -9 & 7 & 9 \end{pmatrix}$

14. $\begin{pmatrix} 8 & 9 \\ 5 & -1 \end{pmatrix} \begin{pmatrix} -2 & 3 \\ 4 & 0 \end{pmatrix} =$

a) $\begin{pmatrix} -6 & 12 \\ 9 & -1 \end{pmatrix}$

b) $\begin{pmatrix} -16 & 27 \\ 20 & 0 \end{pmatrix}$

c) $\begin{pmatrix} 20 & 24 \\ -14 & 15 \end{pmatrix}$

d) $\begin{pmatrix} -1 & -21 \\ 32 & 36 \end{pmatrix}$

15. If $A = \begin{pmatrix} -2 & -4 \\ 5 & 9 \end{pmatrix}$ then $A^{-1} =$

a) $\begin{pmatrix} 9/2 & 2 \\ -5/2 & -1 \end{pmatrix}$

b) $\begin{pmatrix} 9/2 & 5/2 \\ -2 & -1 \end{pmatrix}$

c) $\begin{pmatrix} 9 & 4 \\ -5 & -2 \end{pmatrix}$

d) $\begin{pmatrix} -9/2 & -2 \\ 5/2 & -1 \end{pmatrix}$

16. If $A = \begin{pmatrix} k & 2 \\ 3 & 4 \end{pmatrix}$ is a singular matrix, then the value of $k =$

a) $k = 6$

b) $k = 0$

c) $k = \frac{3}{2}$

d) $k = \frac{2}{3}$

17. The simplification of $e^2 \left(e + \frac{3}{e} \right) - e =$

a) $e^3 - 3e^2 - e$

b) $e^3 + 2e$

c) $e^3 - 4e$

d) $e^3 + 3e^2 - e$

18. Expressing $\log_3 2 = x$ in exponential form gives

a) $2^x = 3$

b) $x = 9$

c) $x = 6$

d) $3^x = 2$

19. The simplification of $\log 2 + \log 3x - \log 2x =$

a) $\log 2$

b) $\log \frac{1}{3}$

c) $\log 3x$

d) $\log 3$

20. If $5 \ln(x) = 10$ then $x =$

a) e^2

b) $\frac{e^{10}}{2}$

c) $\frac{e^{10}}{5}$

d) e^5

21. If $\log_3(2x-3) = 2$ then $x =$

a) 6

b) $\frac{5}{2}$

c) 10

d) $\frac{9}{2}$

22. The equation of the line that has gradient (slope) $m = 5$ and y-intercepts (-3) is

a) $y = -3x + 5$

b) $y = 3x + 5$

c) $y = 5x - 3$

d) $y = -5x - 3$

23. The gradient of the line that passes through $(2,3)$ and $(5,8)$ is

a) $\frac{3}{5}$

b) $\frac{5}{3}$

c) $\frac{7}{11}$

d) $\frac{11}{7}$

24. If $f(x) = 3x^5 - \frac{x^{-4}}{3} + 15$ then $f'(x) =$

a) $4x^4 - \frac{x^{-5}}{3}$

b) $15x^4 + \frac{4}{3}x^{-5}$

c) $\frac{x^6}{2} + \frac{4}{3}x^{-3}$

d) $8x^3 - 4x^{-3}$

25. If $y = e^{2x} - e^{-2x}$, then $\frac{d^2y}{dx^2} =$

a) $2e^{2x} + 2e^{-2x}$

b) $4e^{2x} + 4e^{-2x}$

c) $4e^{2x} - 4e^{-2x}$

d) $4e^x - 4e^{-x}$

26. The stationary point of $y = x^3 - 3x^2 + 3x + 4$ is at

a) $x = 1$

b) $x = 3$

c) $x = -1$

d) $x = -3$

27. The function $y = x^2 + 6x + 9$ has a minimum at the point

a) $(-3, 1)$

b) $(3, 1)$

c) $(3, 0)$

d) $(-3, 0)$

28. $\int e^{6x} dx =$

a) $6e^{5x} + C$

b) $\frac{e^{6x}}{6} + C$

c) $e^{6x} + C$

d) $\frac{e^{7x}}{7} + C$

29. $\int (12x^5 + 4x^{-3} + 7) dx =$

a) $2x^4 - x^{-4} + 7x + C$

b) $12x^6 + 4x^{-2} + 7x + C$

c) $60x^4 - 12x^{-4} + C$

d) $2x^6 - 2x^{-2} + 7x + C$

30. $\int x^{2/3} dx =$

a) $\frac{3}{5}x^{5/3} + C$

b) $\frac{2}{3}x^{-1/3} + C$

c) $\frac{5}{3}x^{3/5} + C$

d) $\frac{5}{3}x^{5/3} + C$

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