

**University of Bahrain  
College of Science  
Department of Mathematics  
First Semester 2008/2009**

**Math A111  
Final Exam**

**Date: 13/01/2009**

**Time: 08:30 – 10:30 α**

**Max. Mark: 60**

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<b>Student Name:</b>	
<b>Student ID :</b>	<b>Section:</b>
<b>Your Instructor's Name:</b>	

**Write all your answers on Page 2.**

**Please check that you have **9** pages**

<b>Max. Marks :</b>	<b>60</b>
<b>Marks Obtained:</b>	

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Answer Sheet  $\alpha$

Student Name:.....	Student ID:.....	Section:...
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**Each of the following questions counts 2 Marks**

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

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

1. The expansion of  $(4 + 5x)(3 - 2x) =$

a)  $12 - 7x - 10x^2$

b)  $12 - 7x + 10x^2$

c)  $12 + 7x - 10x^2$

d)  $12 + 7x + 10x^2$

2. The factorization of  $x^2 + 6x - 16 =$

a)  $(x - 8)(x - 2)$

b)  $(x + 8)(x + 2)$

c)  $(x + 8)(x - 2)$

d)  $(x - 8)(x + 2)$

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

a)  $x = -1, x = -2$

b)  $x = 1, x = 2$

c)  $x = -1, x = 2$

d)  $x = 1, x = -2$

4. The simplification of  $\left(\frac{5x^{-1}y^2}{4z^3}\right)^2 =$

a)  $\frac{25y^4}{16x^2z^6}$

b)  $\frac{25y^4}{16x^6z^2}$

c)  $\frac{10xy^4}{8z^6}$

d)  $\frac{5y^4}{4xz^6}$

5. The simplification of  $\frac{y^2 - 4}{y^2 - 9} \div \frac{4y - 8}{y - 3} =$

a)  $\frac{4(y + 3)}{y + 2}$

b)  $\frac{y - 2}{4(y + 3)}$

c)  $\frac{y - 2}{4(y - 3)}$

d)  $\frac{y + 2}{4(y + 3)}$

6. The simplification of  $\frac{3}{7} + \frac{x}{4x+1} =$

a)  $\frac{19x+1}{7(4x+1)}$

b)  $\frac{5x+4}{7(4x+1)}$

c)  $\frac{15x+2}{7(4x+1)}$

d)  $\frac{19x+3}{7(4x+1)}$

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

a)  $x = 3 \pm \sqrt{21}$

b)  $x = \frac{-3 \pm \sqrt{21}}{2}$

c)  $x = \frac{3 \pm \sqrt{21}}{2}$

d)  $x = \frac{3 \pm \sqrt{3}}{2}$

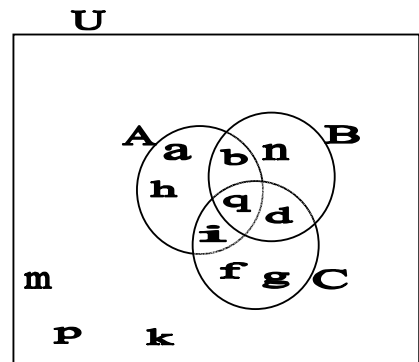
8. From the Venn diagram,  $(A \cap C) \cup B =$

a)  $\{b, q, i, d, n\}$

b)  $\{q, i, d\}$

c)  $\{a, h, b, q, n, d, f, g\}$

d)  $\{b, q, i, n\}$



9. If  $A = \{0, 1, 2, 5, 9\}$ ,  $B = \{1, 2, 7, 8, 9\}$  and  $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ , then  $A' \cap B' =$

a)  $\{3, 4, 6, 7, 8, 10\}$

b)  $\{0, 3, 4, 5, 6, 7, 8, 10\}$

c)  $\{0, 3, 4, 5, 6, 10\}$

d)  $\{3, 4, 6, 10\}$

10. If  $A = \{x \mid x \in N \text{ with } x \leq 6\}$ , where  $N$  is the set of natural numbers, then

a)  $A = \{1, 2, 3, 4, 5\}$

b)  $A = \{0, 1, 2, 3, 4, 5\}$

c)  $A = \{1, 2, 3, 4, 5, 6\}$

d)  $A = \{0, 1, 2, 3, 4, 5, 6\}$

11. The subtraction of the following two binary numbers  $10101-1011=$

- a) 1100
- b) 1010
- c) 1011
- d) 1001

12. The multiplication of the following two binary numbers  $1011\times 1101=$

- a) 10001111
- b) 1001110
- c) 1001101
- d) 10010111

13. If  $\begin{bmatrix} u & 3 \\ 5 & 7 \end{bmatrix} = \begin{bmatrix} 3 & 3 \\ 5 & v+2 \end{bmatrix}$  then the values of  $u$  and  $v$  are

- a)  $u = 6, v = 7$
- b)  $u = 3, v = 5$
- c)  $u = 5, v = 3$
- d)  $u = 7, v = 6$

14.  $\begin{bmatrix} 3 & 4 \\ -5 & 7 \end{bmatrix} \begin{bmatrix} 4 & -3 \\ 2 & 0 \end{bmatrix} =$

- a)  $\begin{bmatrix} 12 & -12 \\ 10 & 0 \end{bmatrix}$
- b)  $\begin{bmatrix} 20 & -9 \\ -6 & 15 \end{bmatrix}$
- c)  $\begin{bmatrix} 12 & 10 \\ -12 & 0 \end{bmatrix}$
- d)  $\begin{bmatrix} 20 & -6 \\ -9 & 15 \end{bmatrix}$

15. If  $D = \begin{bmatrix} 6 & 5 \\ 2 & 2 \end{bmatrix}$  then  $D^{-1} =$

- a)  $\begin{bmatrix} 1 & -5/2 \\ -1 & 3 \end{bmatrix}$
- b)  $\begin{bmatrix} 3 & 5/2 \\ 1 & 1 \end{bmatrix}$
- c)  $\begin{bmatrix} 2 & -5 \\ -2 & 6 \end{bmatrix}$
- d)  $\begin{bmatrix} -1 & 5/2 \\ 1 & 3 \end{bmatrix}$

16.  $\begin{bmatrix} 4 & -6 \\ 11 & 7 \end{bmatrix} + \begin{bmatrix} -3 & 5 \\ 4 & 6 \end{bmatrix} =$

a)  $\begin{bmatrix} 7 & 11 \\ 15 & 13 \end{bmatrix}$

b)  $\begin{bmatrix} 1 & 1 \\ 15 & 13 \end{bmatrix}$

c)  $\begin{bmatrix} 1 & 11 \\ 15 & 13 \end{bmatrix}$

d)  $\begin{bmatrix} 1 & -1 \\ 15 & 13 \end{bmatrix}$

17. If  $f(x) = 2x + 3$  and  $g(x) = x^2 - 5$  then  $g(f(2)) =$

a) 1

b) 3

c) 44

d) 54

18. If  $f(x) = 5x - 10$ , then  $f^{-1}(x) =$

a)  $\frac{x}{5} + 2$

b)  $\frac{1}{5}x + \frac{1}{10}$

c)  $-5x + 10$

d)  $\frac{1}{5x - 10}$

19. The function  $f(x) = x^4 + 1$  is

a) an odd function only

b) an even function only

c) both an even and odd functions

d) neither an even nor an odd function

20. If  $f(x) = 3x - 2$  and  $g(x) = (x + 1)^2$  then  $f(2) + g(-2) =$

a) 0

b) 5

c) 4

d) 9

21. If  $f(x) = 2x^4 - x^{-4} + 15$  then  $f'(x) =$

a)  $8x^3 + 4x^{-5}$

b)  $4x^3 + 4x^{-3}$

c)  $8x^4 + 4x^{-4}$

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

22. If  $y = \sqrt[5]{t^3}$ , then  $\frac{dy}{dt} =$

a)  $\frac{3}{5}t^{-2/5}$

b)  $\frac{5}{3}t^{-2/5}$

c)  $\frac{3}{5}t^{2/3}$

d)  $\frac{5}{3}t^{2/3}$

23. If  $y = x^6 + x^2 + 7$ , then  $\frac{d^2y}{dx^2} =$

a)  $6x^5 + 2x$

b)  $30x^4$

c)  $30x + 2$

d)  $30x^4 + 2$

24. The function  $y = 2x^2 + 8x$  has a minimum at

a)  $x = \frac{1}{2}$

b)  $x = \frac{-1}{2}$

c)  $x = -2$

d)  $x = 2$

25. The gradient (slope) of the tangent line to the curve  $y = 3x^3 - 9x + 2$  when  $x = 0$  is

a)  $-9$

b)  $18$

c)  $2$

d)  $9$

26. The height,  $h$ , of a grass is given by  $h(t) = -t^2 + 6t + 5$ , where  $t$  is the time measured in days. The maximum height of the grass  $h$  is when  $t =$
- a) 5 days
  - b) 3 days
  - c) 11 days
  - d) 8 days

27.  $\int (3x^3 + 7x^2 - 8) dx =$

- a)  $9x^2 + 14x$
- b)  $x^4 + x^3 - 8x + C$
- c)  $9x^4 + 14x^3 - 8x + C$
- d)  $\frac{3}{4}x^4 + \frac{7}{3}x^3 - 8x + C$

28.  $\int_0^3 (2x + 5) dx =$

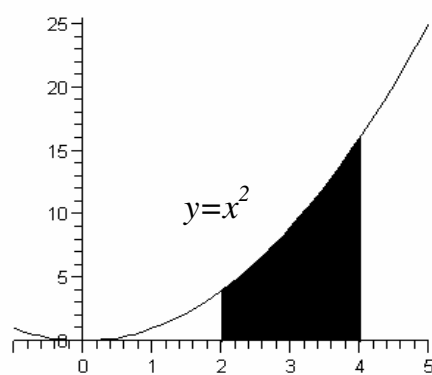
- a) 9
- b) 11
- c) 24
- d) 15

29. The particular solution of the differential equation  $f'(x) = 3x^2 + 2x + 1$  at the point  $(1, 5)$  is

- a)  $f(x) = x^3 + x^2 + x$
- b)  $f(x) = x^3 + x^2 + x + 5$
- c)  $f(x) = x^3 + x^2 + x + 2$
- d)  $f(x) = x^3 + x^2 + x + 1$

30. The shaded area between the curve  $y = x^2$  and the  $x$ -axis from  $x = 2$  to  $x = 4$  is equal

- a)  $\frac{64}{3}$
- b)  $\frac{56}{3}$
- c)  $\frac{63}{3}$
- d)  $\frac{65}{3}$





# Draft Page