

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

MATH A111

Final Exam

Date: 18/06/2009

Time: 08:30 – 10:30 α

Max. Mark: 60

Coordinators: Prof. Shoukry Hassan & Dr. Thuraya Juma

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

Write all your answers on Page 2.

Please check that you have 10 pages

| | |
|-----------------------|-----------|
| Max. Marks | 60 |
| Marks Obtained | |

☺ ☺ ☺ ☺ **G O O D L U C K** ☺ ☺ ☺ ☺

Answer Sheet α

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 $\mathcal{E} = \{a, b, c, d, e, f, g, h, i\}$, $A = \{a, b, c, d\}$, $B = \{a, c, e, h, f\}$, then $(\overline{A \cup B}) =$

- a) $\{g, h, i\}$ b) $\{g, i\}$
c) $\{g\}$ d) $\{i\}$

2. The simplification of $\frac{(5x^{-2})(2xy)^2}{10x^3} =$

- a) $\frac{5y^2}{2x^7}$ b) $\frac{2y^2}{x^3}$
c) $2x^3y^2$ d) $\frac{20y^2}{x^3}$

3. The expansion of $(3+2m)(4-m) =$

- a) $2m^2 + 5m + 12$ b) $2m^2 - 5m + 12$
c) $-2m^2 - 5m - 12$ d) $-2m^2 + 5m + 12$

4. If $f(x) = 3x - 2$ and $g(x) = \frac{x}{3}$ then $f(g(6)) =$

- a) 4 b) 18
c) 2 d) $\frac{16}{3}$

5. The solutions of the equation $x^2 - 5x + 1 = 0$ are

- a) $x = \frac{-5 \pm \sqrt{21}}{2}$ b) $x = \frac{-5 \pm \sqrt{29}}{2}$
c) $x = \frac{5 \pm \sqrt{21}}{2}$ d) $x = \frac{5 \pm \sqrt{29}}{2}$

6. $\begin{pmatrix} 6 & 5 \\ 2 & -1 \end{pmatrix} \begin{pmatrix} 3 & 2 \\ -1 & 4 \end{pmatrix} =$

a) $\begin{pmatrix} 18 & -2 \\ 10 & -4 \end{pmatrix}$

b) $\begin{pmatrix} 13 & -8 \\ 7 & 0 \end{pmatrix}$

c) $\begin{pmatrix} 18 & 10 \\ -2 & -4 \end{pmatrix}$

d) $\begin{pmatrix} 13 & 32 \\ 7 & 0 \end{pmatrix}$

7. The factorization of $x^2 + 9x - 10 =$

a) $(x-10)(x-1)$

b) $(x+10)(x+1)$

c) $(x+10)(x-1)$

d) $(x-10)(x+1)$

8. The solutions of the equation $x^2 + 2x - 35 = 0$ are

a) $x = -5, x = 7$

b) $x = -7, x = 5$

c) $x = -5, x = -7$

d) $x = 7, x = 5$

9. The simplification of $\frac{x^2 - 25}{3x} \div \frac{3x^2 + 15x}{9x^2} =$

a) $x - 5$

b) $x + 5$

c) $\frac{1}{x+5}$

d) $\frac{x+5}{3}$

10. The gradient (m) and y-intercepts (c) of the line $y = 3x - 5$ are

a) $m = 3, c = -5$

b) $m = -5, c = 3$

c) $m = 1/3, c = 1/5$

d) $m = -3, c = -5$

11. The binary number 110001 in decimal system is equal

12. $\int \frac{1}{x^4} dx =$

- a) $x^4 + C$

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

c) $-4x^{-5}$

d) $\frac{1}{4x^5} + C$

13. The singular matrix is

$$a) \quad A = \begin{pmatrix} 9 & 5 \\ -2 & 0 \end{pmatrix}$$

$$\text{b) } B = \begin{pmatrix} 2 & 3 \\ 2 & 3 \end{pmatrix}$$

$$c) \quad C = \begin{pmatrix} 2 & 2 \\ 2 & 4 \end{pmatrix}$$

$$\text{d) } D = \begin{pmatrix} 4 & 5 \\ 1 & 2 \end{pmatrix}$$

14. $\int (8x^3 - 2x^{-3} + 9) \, dx =$

- a) $24x^2 + 6x^{-4}$ b) $8x^4 - 2x^{-4} + 9x + C$
 c) $2x^4 + x^{-2} + 9x + C$ d) $x^4 + -2x^{-2} + 9x + C$

15. The simplification of $\frac{x-1}{x+3} + \frac{2}{x} =$

$$\text{a) } \frac{x^2 + x + 6}{x(x+3)}$$

$$\text{b) } \frac{x^2 + 3x + 6}{x(x+3)}$$

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

$$\text{d) } \frac{x^2 - x + 6}{x(x+3)}$$

16. If $f(x) = \sqrt{x} - 1$, then $f^{-1}(x) =$

- a) $\sqrt{x-1}$ b) $\frac{1}{\sqrt{x}} + 1$
c) $\frac{1}{\sqrt{x}-1}$ d) $\sqrt{x+1}$

17. The function $y = x^2 - 4x + 7$ has a minimum at the point

- a) (2, 19) b) (3, 2)
c) (2, 3) d) (-2, 19)

18. The gradient (slope) of the line that passes through (6,8) and (1, -2) is

- a) 2 b) $\frac{1}{2}$
c) $-\frac{1}{2}$ d) 2

19. $\begin{pmatrix} 2 & 5 \\ -3 & 0 \end{pmatrix} - \begin{pmatrix} 2 & -4 \\ 3 & 6 \end{pmatrix} =$

- a) $\begin{pmatrix} 0 & 1 \\ -6 & 6 \end{pmatrix}$ b) $\begin{pmatrix} 0 & 9 \\ 6 & -6 \end{pmatrix}$
c) $\begin{pmatrix} 0 & 9 \\ 6 & 6 \end{pmatrix}$ d) $\begin{pmatrix} 0 & 9 \\ -6 & -6 \end{pmatrix}$

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

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

21. If $e^{(3x)} = 9$ then $x =$

- a) $\ln 3$ b) 3
c) $\frac{\ln 9}{3}$ d) $\ln 9 - 3$

22. The stationary point of $y = 3x^2 - 6x + 8$ is at

- a) $x = -1$ b) $x = 0$
c) $x = 1$ d) $x = 6$

23. The value of $\log_6 5 =$

- a) $\frac{\ln 6}{\ln 5}$ b) $\frac{\ln 5}{\ln 6}$
c) $\ln \frac{5}{6}$ d) $\frac{5}{6}$

24. The simplifying $\log 5y^2 + \log 4y - \log 10y^2 =$

- a) $\log y$ b) $\log\left(\frac{1}{2y}\right)$
c) $\log 2$ d) $\log 2y$

25. $\int \frac{1}{\sqrt{x}} dx =$

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

26. The solution of $\frac{2x+4}{5} = \frac{x-3}{2}$ is

- a) $x = \frac{23}{9}$ b) $x = 7$
c) $x = 23$ d) $x = \frac{9}{7}$

27. If $\log_{10}(x+4) = 1$ then $x =$

- a) 6 b) 0
c) 14 d) 10

28. If $y = x^5 + x^2 + 12$, then $\frac{d^2y}{dx^2} =$

- a) $5x^4 + 2x$ b) $20x^3$
c) $20x^3 + 2$ d) $12x^3 + 2x$

29. If $B = \begin{pmatrix} 4 & 11 \\ 1 & 3 \end{pmatrix}$ then $B^{-1} =$

- a) $\begin{pmatrix} 3 & 11 \\ 1 & 4 \end{pmatrix}$ b) $\begin{pmatrix} 1/4 & 1/11 \\ 1 & 1/3 \end{pmatrix}$
c) $\begin{pmatrix} 4 & -11 \\ -1 & 3 \end{pmatrix}$ d) $\begin{pmatrix} 3 & -11 \\ -1 & 4 \end{pmatrix}$

30. Expressing $4^x = 7$ in logarithmic form gives

- a) $x = \log_7 4$ b) $x = \log_4 7$
c) $7 = \log_4 x$ d) $4 = \log_x 7$

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