Sultan Qaboos University
Centre for Preparatory Studies – Department of Mathematics and IT
Mathematics for Economics – FPMT0107
EXIT TEST
(Sample)

Instructions:

- This test is an on-line test, which contains 40 multiple choice questions.
- Attempt all questions. Time allowed is 90 minutes.
- Choose the most appropriate answer for each multiple choice question.
- Rough work done on the given extra sheet will not be graded.

1. The domain of the function $g(x)=\begin{cases}2x-1, & \text{if } x<2\\ 3x, & \text{if } x>2\end{cases}$ is

(A) *All real numbers except* 2 **(B)** *All real numbers*

(C) $[-2,\ 2]$ **(D)** $(-2,\ 2)$

2. The union of intervals $[-5,\ 7)$ and $(-1,+\infty)$ is

(A) $(-1,\ 7)$ **(B)** $[-5,+\infty)$ **(C)** $[-5,-1)$ **(D)** $(-\infty,\ 7]$

3. The product of $(3x-5)(2x^2+6)$ is

(A) $6x^3-30$ **(B)** $6x^3-10x^2+18x-30$

(C) $6x^3+10x^2-18x+30$ **(D)** $6x^2-18x+1$

4. Simplify the expression $\left(\dfrac{25x^2y^{-4}}{x^9}\right)^{\frac{1}{2}}$

(A) $\dfrac{5}{x^{7/2}y^2}$ **(B)** $\dfrac{12.5}{x^4y^2}$ **(C)** $\dfrac{5}{x^4y^2}$ **(D)** $\dfrac{12.5}{x^{7/2}y^2}$

5. Which of the following equations defines y as a function of x?

(A) $x-2|y|=0$ **(B)** $x-5=y^2$ **(C)** $(x-1)^2+y^2=16$ **(D)** $5x-2y=19$

6. The solution of the inequality $|x-5|\le 2$ (*in interval notation*) is

(A) $(3,\ 7)$ **(B)** $(-3,-7)$ **(C)** $[3,\ 7]$ **(D)** $(-3,\ 7]$

7. The solution set of the equation $\frac{1}{x} = \frac{2}{x^2 - 3}$ is

(A) $x = 1,\ 3$ **(B)** $x = 1, -3$ **(C)** $x = 0,\ 3$ **(D)** $x = -1,\ 3$

8. The equation of line passing through point $(-2,\ 3)$ and parallel to line $3x + y + 13 = 0$ is

(A) $x - 3y + 6 = 0$ **(B)** $3x + y + 3 = 0$ **(C)** $2x - y + 9 = 0$ **(D)** $2x - y - 3 = 0$

9. If $f(x) = \frac{x^2}{x + 2}$ and $g(x) = \sqrt{3 - x}$, find the domain of function $(f - g)(x)$.

(A) $(-\infty, -2) \cup (-2,\ 3]$ **(B)** $(-\infty, -2)$ **(C)** $(-\infty,\ 3]$ **(D)** $[3, +\infty)$

10. Find the inverse of function $f(x) = \frac{x}{x + 2}$.

(A) $f^{-1}(x) = \frac{x + 2}{x}$ **(B)** $f^{-1}(x) = \frac{x + 1}{2x}$ **(C)** $f^{-1}(x) = \frac{2x}{1 - x}$ **(D)** $f^{-1}(x) = \frac{x}{x - 2}$

11. Which of the following is one-to-one function?

(A) $f(x) = |x + 5|$ **(B)** $f(x) = (x + 2)^2,\quad x \le 0$

(C) $f(x) = \sqrt{x + 3}$ **(D)** $f(x) = x^4$

12. The domain of the function $f(x) = \ln(x + 1)$ is

(A) $(-\infty,\ -1)$ **(B)** $(-1,\ \infty)$ **(C)** $[-1,\ \infty)$ **(D)** $(-\infty,\ -1]$

13. The range of the function $g(x) = e^x + 5$ is

(A) $[5,\ +\infty)$ **(B)** $[0, +\infty)$ **(C)** $(-\infty, +\infty)$ **(D)** $(5, +\infty)$

14. A rectangle has area 200 cm² and a perimeter of 60 cm. Its length (l) and width (w) are

(A) $l = 25\ cm,\quad w = 8\ cm$ **(B)** $l = 40\ cm,\quad w = 5\ cm$

(C) $l = 20\ cm,\quad w = 10\ cm$ **(D)** $l = 15\ cm,\quad w = 15\ cm$

15. If $\log_2 32 = 7x - 2$, then x is

(A) $\frac{18}{7}$ **(B)** 2 **(C)** 1 **(D)** 5

16. The solution of the exponential equation $10 - e^{5x-3} = 0$, correct to 4 decimal places, is

(A) 1.0605 **(B)** –0.1395 **(C)** 5.3026 **(D)** 1.5794

17. The equation $\ln(1-x)=-1$ has the solution

(A) $x=e^{-1}-1$ **(B)** $x=1-e^{-1}$ **(C)** $x=1-e$ **(D)** *No solution*

18. The value of an investment of 250 rials, compounded continuously at a nominal annual rate of interest 7.5%, after 6 years is

(A) 492 rials **(B)** 592 rials **(C)** 392 rials **(D)** 292 rials

19. The expression $e^{\ln 7+3\ln x}$ can be written as

(A) $21x$ **(B)** $3x^7$ **(C)** $7x^3$ **(D)** $7+x^3$

20. The solution set of the equations $\begin{cases} 12x-25y=7 \\ -24x+50y=14 \end{cases}$ is

(A) $x=\dfrac{7}{12},\quad y=0$ **(B)** $x=0,\quad y=-\dfrac{7}{25}$

(C) $x=0,\quad y=\dfrac{7}{25}$ **(D)** *None of these*

21. The population P of a city at time t is given by the formula $P(t)=50000e^{0.05t}$, where t is measured in years. The population in 10 years will be

(A) 82634 **(B)** 83436 **(C)** 82436 **(D)** 86432

22. The graph of $g(x)$ is obtained when $f(x)=|x|$ is shifted one unit to the right and then shifted two units down. The function $g(x)$ is

(A) $g(x)=|x+1|+2$ **(B)** $g(x)=|x-1|+2$ **(C)** $g(x)=|x-2|-1$ **(D)** $g(x)=|x-1|-2$

23. The minimum value of $f(x)=3x^2-12x+17$ is

(A) 5 **(B)** -5 **(C)** 17 **(D)** 2

24. The solution(s) of the equation $\log_x(2x+24)=2$ is (are)

(A) $x=-4,\ 6$ **(B)** $x=6$ **(C)** $x=-4$ **(D)** $x=-6,\ 4$

25. The revenue generated by selling q units of graphing calculators is given by the function $R(q)=-0.3q^2+30q+12$. The maximum expected revenue is

(A) 12 **(B)** 762 **(C)** 672 **(D)** 596

26. A radioactive substance decays in such way that the amount of mass remaining after t days is given by $m(t)=20e^{-0.02t}$, where m is measured in grams. If the mass remaining after t days is 10 grams then t will be approximately

(A) 35 *days* **(B)** 36 *days* **(C)** 33 *days* **(D)** 30 *days*

27. The solution of the equation $e^{2x} + 2e^{x} - 35 = 0$ is

(A) -7 *and* 5 **(B)** $\ln 5$ **(C)** -7 **(D)** 5

28. Find the Present value of 8 000 rials due after 5 years if the interest rate is 10% compounded monthly.

(A) 4 862 rials **(B)** 5 866 rials **(C)** 13 162 rials **(D)** 8 000 rials

29. The following system of inequalities $\begin{cases} x \le 0 \\ y > -1 \\ y - 2x > 2 \end{cases}$ is satisfied by

(A) $x = 1, \quad y = 0$ **(B)** $x = 0, \quad y = 1$

(C) $x = -1, \quad y = 1$ **(D)** *None of these*

30. Consider solving the following system of equations by Cramer's rule. $\begin{cases} 3x - 6y + z = 0 \\ 8x + 3z = 9 \\ -x + 9y = 0 \end{cases}$

If $\begin{vmatrix} 3 & -6 & 0 \\ 8 & 0 & 9 \\ -1 & 9 & 0 \end{vmatrix} = -189$, $\begin{vmatrix} 0 & -6 & 1 \\ 9 & 0 & 3 \\ 0 & 9 & 0 \end{vmatrix} = 81$, and $\begin{vmatrix} 3 & -6 & 1 \\ 8 & 0 & 3 \\ -1 & 9 & 0 \end{vmatrix} = 9$, then x is equal to

(A) -21 **(B)** $-\frac{7}{3}$ **(C)** $\frac{1}{9}$ **(D)** 9

31. If $2\begin{bmatrix} y & 6 \\ 4 & x \end{bmatrix} + 4\begin{bmatrix} y & 2 \\ -4 & 1 \end{bmatrix} = \begin{bmatrix} 12 & 20 \\ -8 & x \end{bmatrix}$ then x is equal to

(A) 2 **(B)** -4 **(C)** -3 **(D)** 4

32. Perform matrix multiplication: $\begin{bmatrix} -3 & 4 & 2 \\ 2 & 0 & 1 \end{bmatrix}\begin{bmatrix} 0 & 1 \\ 3 & -4 \\ 6 & 5 \end{bmatrix}$.

(A) $\begin{bmatrix} 24 & -9 \\ 6 & 7 \end{bmatrix}$ **(B)** $\begin{bmatrix} 24 & 6 \\ -9 & 7 \end{bmatrix}$ **(C)** $\begin{bmatrix} 16 & -10 \\ -11 & 5 \end{bmatrix}$ **(D)** *Undefined*

33. Use row reduction method to solve the following system of linear equations: $\begin{cases} x + 2z = 1 \\ y + z = 2 \\ x + z = 1 \end{cases}$

(A) $x = 1, \quad y = 2, \quad z = 0$ **(B)** $x = 2, \quad y = 1, \quad z = -1$

(C) $x = -1, \quad y = 0, \quad z = 2$ **(D)** $x = 11, \quad y = -3, \quad z = 5$

34. Evaluate the determinant $\begin{vmatrix} 6 & 3 & 0 \\ 1 & -2 & 5 \\ -2 & 0 & 1 \end{vmatrix}$.

(A) 45 **(B)** 50 **(C)** –90 **(D)** –45

35. The angle of elevation to the top of a flagpole is found to be $35°$ from the ground at a distance of 25 meters (*m*) from the base of the flagpole. Find the height of the flagpole.

(A) $14.3\ (m)$ **(B)** $17.5\ (m)$ **(C)** $10\ (m)$ **(D)** $11.8\ (m)$

36. Let θ be an acute angle of a right triangle. If $\cos\theta = \frac{\sqrt{3}}{2}$, find the value of $\csc\theta$.

(A) $\frac{2}{\sqrt{3}}$ **(B)** $\frac{3}{2}$ **(C)** $\frac{1}{2}$ **(D)** 2

37. The length of an arc of a circle with radius 10 meters (*m*) that subtends a central angle of $30°$ is

(A) $5\ (m)$ **(B)** $\frac{5\pi}{3}\ (m)$ **(C)** $\frac{10\pi}{3}\ (m)$ **(D)** $10\pi\ (m)$

38. A quiz consists of six Multiple-Choice Questions (with three choices each) and four TRUE-FALSE questions. In how many different ways can the quiz be answered?

(A) $3^6 + 2^4$ **(B)** $6^3 \times 4^2$ **(C)** $3^6 \times 2^4$ **(D)** $6^3 + 4^2$

39. In a sample of 15 observations, the largest observation is increased by 60. The mean will be

(A) *increase by* 15 **(B)** *increase by* 60 **(C)** *increase by* 4 **(D)** *remain the same*

40. A bag contains nine equally round balls of which five are blue and four are red. Two ball are drawn at random without replacement. What is the probability that both balls will be blue?

(A) $\frac{5}{36}$ **(B)** $\frac{5}{9}$ **(C)** $\frac{1}{2}$ **(D)** $\frac{5}{18}$

End of Test

Mathematics for Economics – FPMT0107

EXIT TEST

(Sample)

ANSWER KEY

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
A	**B**	**B**	**A**	**D**	**C**	**D**	**B**	**A**	**C**
Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
C	**B**	**D**	**C**	**C**	**A**	**B**	**C**	**C**	**D**
Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
C	**D**	**A**	**B**	**B**	**A**	**B**	**A**	**C**	**D**
Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40
B	**A**	**A**	**D**	**B**	**D**	**B**	**C**	**C**	**D**