



Arsi University
College of Natural and Computational Sciences
Department of Mathematics
Mathematics For Social Science(Math 1011S) Final Exam for 1st year Students

Date: 29/03/2021

Time allowed: 3:00 hr.

Max Load: 50%

Name: _____ **ID NO:** _____

Department: _____ **Section:** _____

General Instructions:

- ♣ Write your **Name and Identification number** on the spaces provided above.
- ♣ Switch off your **mobile phone** before you start the exam.
- ♣ Check that this exam paper contains **four parts** (**Part I:** Multiple Choices, **Part II:** Fill in the blanked space, **Part III:** Definition and **Part IV:** Work out questions) with eight pages including the cover and attached papers.
- ♣ Attempt all questions based on the instructions provided in each part.
- ♣ Write your answers clearly and neatly; unreadable answer may worth no value.
- ♣ If you need more space, use the back page of each sheet.
- ♣ Any irregularity on the examination leads to "F" Grade.

For instructor's use only

Continuous Assessments	Part I	Part II	Part III	Part IV	Total Final	Total
50%	5%	6%	6%	33%	50%	100%

Part I: Write TRUE if the statement is correct or write FALSE if the statement is incorrect on the space provided. (1 point each)

1. If $f : A \rightarrow B$ is onto function, then its codomain and its Range are equal _____
2. All one- to-one functions have an inverse. _____
3. The set of irrational number is close under addition and multipilcation _____
4. Multiplication of matrix is commutative. _____
5. The sum of rational and irrational number is always irrational number. _____

Part II: Encircle the correct answer from the chosen alternatives. (1.5 point each)

6. The solution set of $\frac{8x+3}{2} - 5(x+2) > -3(x+\frac{5}{6})$ is _____
 A. $x < \frac{-1}{2}$ C. $x > 3$
 B. $x < -3$ D. $x > \frac{1}{2}$
7. Which one of the following is an irrational number?
 A. 0.526525252... C. $12.135\overline{289}$
 B. 3.0100100010001 D. $0.272272227\ldots$
8. A man has a daughter and a son. The man is five times older than his daughter. Moreover, his age is twice of the sum of the ages of his daughter and son. His daughter is 3 years younger than his son. How old is the man and his children respectively?
 A. 35,6 C. 30,9
 B. 9,30 D. 30,6
9. If $f(x) = \frac{x-1}{x+1}$ and $f(k) = 5$, then $f(2k)$ is equal to
 A. $\frac{2}{3}$ C. 2
 B. -13 D. $\frac{-3}{2}$
10. The solution set of the quadratic equation $x^2 - 6x - 16 = 0$ is
 A. $\{-8, 2\}$ C. $\{-2, 8\}$
 B. $\{1, 6\}$ D. $\{-3, 4\}$
11. If $A = \begin{pmatrix} 4 & 5 \\ 1 & -1 \end{pmatrix}$ and $B = \begin{pmatrix} 6 & 8 \\ -2 & -1 \end{pmatrix}$, then $\det(AB)$ is
 A. -30 C. 6
 B. -90 D. 10

12. If $\det \begin{pmatrix} x & x+2 \\ x+1 & 2x \end{pmatrix} = -2$, then the value of x are

A. 1, -3

C. 0, -3

B. 2, 3

D. 0, 3

Part III: Fill in the blanked space with appropriate answers. (1.5 point each)

13. If R is a relation defined on N by $R = \{(a, b) : a + 2b = 11, a, b \in N\}$, then find Range of R^{-1} _____

14. The inverse of matrix $A = \begin{pmatrix} 8 & 3 \\ 6 & 4 \end{pmatrix}$ is _____

15. If $A = \begin{pmatrix} -1 & 2 & 7 & 0 \\ 3 & 8 & -5 & 4 \\ 1 & 2 & 6 & -4 \\ 4 & -1 & -2 & 0 \end{pmatrix}$, then trace of A ($\text{tr}(A)$) _____

16. If $f(x) = 4x - 6$. find $g(x)$ so that $(f \circ g)(x) = 80x^2 - 120x - 6$ _____

17. If $f(x+4) = x^2 + 10$, then $f(0)$ _____

18. If $f(x) = \sqrt[3]{x+1}$, then $f^{-1}(x)$ _____

Part IV: Show all the necessary steps clearly and neatly.

(16 points)

19. Find the domain and range of

(4 points)

$$g(x) = \sqrt{2x^2 + 5x - 3}$$

20. Solve the linear system

(4 points)

$$x - 2y + z = 7$$

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

$$2x + 3y + 2z = 7$$

21. Given the matrix $A = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 4 \end{pmatrix}$, then find

(4 points)

i. Determinant of A

ii. $\text{Adj}(A)$

iii. The inverse of A

22. If f is a real function defined by $f(x) = \frac{x-1}{x+1}$, then

Show that $f(2x) = \frac{3f(x) + 1}{f(x) + 3}$

(4 point)