

NAME: _____ Score _____ /100

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SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Circle T or F, whichever is correct.

Two points each for Questions 1 – 35. Five points each for the last six questions.

1. **T** F If an expression is added to both sides of an inequality, the result is an inequality which is equivalent to the first inequality.
2. **T** **F** If both sides of an inequality are multiplied by the same non-zero real number, the result is an inequality which is equivalent to the original inequality.
3. **T** F $x > -5$ is a simplest inequality.
4. **T** F The inequality $|-2x + 3| < 5$ is equivalent to $-5 < -2x + 3 < 5$.
5. **T** **F** The inequality $|-2x + 3| > 5$ is equivalent to $-5 > -2x + 3 > 5$.
6. **T** F If two inequalities have the same solution set they are equivalent inequalities.
7. **T** F If both sides of an inequality are multiplied by the same positive real number, the result is an inequality which is equivalent to the original inequality.
8. **T** **F** If both sides of an inequality are multiplied by the same negative real number, the result is an inequality which is equivalent to the original inequality.
9. **T** **F** Every square matrix has an inverse.
10. **T** **F** If A has order 2×3 and B has order 3×4 , then $A + B$ is defined.
11. **T** F If A has order 2×3 and B has order 3×4 , then AB is defined.
12. **T** **F** If A has order 2×3 and B has order 3×4 , then BA is defined.
13. **T** **F** For certain scalars and certain matrices, the scalar product is not defined.
14. **T** **F** Matrix multiplication is commutative.
15. **T** **F** The log and exp functions are inverses of each other.
16. **T** F The ln and exp functions are inverses of each other.
17. **T** **F** $\ln(x + y) = \ln(x) + \ln(y)$.
18. **T** F $k \ln(x) = \ln(x^k)$.
19. **T** **F** $\ln(0) = 1$.
20. **T** F $\exp(0) = 1$.
21. **T** F $\ln(1) = 0$.
22. **T** **F** $\exp(1) = 0$.
23. **T** **F** $e^{x+y} = e^x + e^y$.
24. **T** F $e^{x-y} = \frac{e^x}{e^y}$.
25. **T** F The point (0, 0) is in the solution set for the inequality $3x + 2y > -7$
26. **T** **F** The boundary line is part of the solution set for the inequality $3x + 2y > 5$.
27. A number (or numbers) that makes an inequality true when substituted for the variable (or variables) is called a **solution** of the inequality.
28. Two inequalities are **equivalent** inequalities if they have the same solution sets
29. A linear inequality in one variable x is an inequality which can be written in the form **$ax + b < 0$** .
30. The **solution set** of an inequality consists of all the points, and only those points, which are solutions of the inequality
31. If the same **expression** is added to (or subtracted from) both sides of an inequality the resulting inequality will be equivalent to the original inequality.
32. Two matrices A and B are equal if they have the same **order** and corresponding **entries** are equal.
33. $\exp \circ \ln(3x^2 - 4x + 7) = 3x^2 - 4x + 7$
34. Write the exponential statement $e^3 = 20.085$ in logarithmic form.

$$3 = \ln(e^3) = \ln(20.085)$$

35. Write the equation for the boundary line for the inequality $2x + 3y < 6$

The boundary line for $2x + 3y < 6$ is $2x + 3y = 6$

36. Sketch the graph of the solution for the system $\begin{cases} x + y \leq 2 \\ -x + y \geq 1 \end{cases}$

Show the boundary lines, the important intercepts, and a test point.
Show all important computations. Use the back of Page 1.

**Boundary line for $x + y \leq 2$ is $x + y = 2$
its x-intercept is 2 and its y-intercept is 2**

Use $(0, 0)$ as the test point to obtain $0 + 0 \leq 2$, a true statement.

**Boundary line for $-x + y \geq 1$ is $-x + y = 1$
its x-intercept is -1 and its y-intercept is 1**

Use $(0, 0)$ as the test point to obtain $-0 + 0 \geq 1$, a false statement.

37. Perform the addition:

$$\begin{bmatrix} 2 & -2 & 1 \\ 4 & -3 & 0 \end{bmatrix} + \begin{bmatrix} -1 & 0 & 5 \\ -2 & -3 & 1 \end{bmatrix} = \begin{bmatrix} 1 & -2 & 6 \\ 2 & -6 & 1 \end{bmatrix}$$

38. Perform the multiplication:

$$\begin{bmatrix} 1 & 2 & -3 \\ 4 & -2 & 5 \end{bmatrix} \begin{bmatrix} 1 & -2 \\ -5 & 0 \\ 2 & 7 \end{bmatrix} = \begin{bmatrix} -15 & -23 \\ 24 & 27 \end{bmatrix}$$

39. Solve the inequality $-3x + 7 < -8$

$$\mathbf{-3x < -15}$$

$$\mathbf{x > 5}$$

40. Solve the inequality $|2x + 5| < 5$

$$\mathbf{-5 < 2x + 5 < 5}$$

$$\mathbf{-10 < 2x < 0}$$

$$\mathbf{-5 < x < 0}$$

The solution set for $|2x + 5| < 5$ is $\{x \mid -5 < x < 0\} = (-5, 0)$

41. What is the solution set for $|2x + 5| > 5$

It follows from Number 40 that the solution set for $|2x + 5| > 5$ is $(-\infty, -5) \cup (0, +\infty)$

