

NAME: _____ Score _____ /100
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SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

2 points each for questions 1 – 25. 5 points each for questions 26 – 35.

Circle T or F, whichever is correct.

1. **T** F The graph of a linear equation in two variables is a non-vertical line.
2. T **F** The graph of a linear inequality in two variables is a non-vertical line.
3. **T** F $x^{-3} = \frac{1}{x^3}$.
4. T **F** 32×10^{43} is an example of scientific notation.
5. T **F** The solution for $|3x + 2| < 1$ is the interval $(-1, 1)$.
6. T **F** $|x + 2| > 5$ is equivalent to $-5 > x + 2 > 5$
7. T **F** A solution for an equation in two variables is a number.
8. **T** F The equation $3x + 2 = -7y + \pi$ is a linear equation in two variables.
9. **T** F The graph of $3y - 2x < 6$ is a half-plane.
10. T **F** $x^3x^5 = x^{15}$.

Fill in each of the blanks to make the statements true.

11. The slope-intercept form of the equation of a non-vertical line is **$y = mx + b$** .
12. The point-slope form of the equation of a non-vertical line is **$y - y_1 = m(x - x_1)$** .
13. The formula for the slope of a line through two points is **$m = \frac{y_1 - y_2}{x_1 - x_2}$** .
14. The equation $y = 3x + 5$ is the boundary equation for **$y < 3x + 5$** and **$y > 3x + 5$** .
15. The slope of a horizontal line is **0**.
16. The slope of a vertical line is **undefined**.
17. Two lines are perpendicular if their slopes are **negative reciprocals** of each other.
18. The formula for the distance between two points is **$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$** .
19. Write 35,000,000 in scientific notation **3.5×10^7** .
20. Write 1.7×10^{-5} in decimal notation **0.000017**.

21. If the inequality symbol in an inequality in two variables is replaced with an equality symbol, the graph of the resulting equation is called the **boundary line** for the inequality.

22. Write the equation of the horizontal line with y-intercept (0, 5) **$y = 5$** .

23. What is the distance between the points (2, 3) and (3, 4)?

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = \sqrt{(3 - 2)^2 + (4 - 3)^2} = \sqrt{2}.$$

24. A point is on the x-axis if and only if its second coordinate is **0**.

25. What is the base in the exponential expression -7^{49} ? **7**.

26. Label the quadrants in Fig. 2.

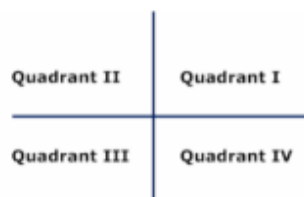


Fig. 2

27. The graph of the line $\frac{3}{5}x - \sqrt{3}y = \pi$ is shown in Fig. 1.

Show the work necessary to determine the solution set for

$\frac{3}{5}x - \sqrt{3}y > \pi$. Use words to explain your work. Then shade that solution set on Fig. 1.

Test (0,0) in the inequality to obtain $0 > \pi$, which is FALSE. Therefore the other side of the line is the solution set.



Fig. 1

28. Simplify $\left(\frac{x^7y^{-3}}{z^{-4}}\right)^{-5}$. Write the result with positive exponents only.

$$\left(\frac{x^7y^{-3}}{z^{-4}}\right)^{-5} = \frac{x^{-35}y^{15}}{z^{20}} = \frac{y^{15}}{x^{35}z^{20}}$$

29. Perform the following division. Write the quotient in scientific notation.

$$\frac{3.6 \times 10^{-4}}{9 \times 10^{12}} = \left(\frac{3.6}{9} \right) \times 10^{-4-12} = 0.4 \times 10^{-16} = 4 \times 10^{-17}$$

30. Write the inequality $|4x - 9| < 7$ as an equivalent compound inequality. **Do not solve it!**

$$-7 < 4x - 9 < 7$$

31. Solve the equation $|5x - 7| < 2$. Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.

$$-2 < 5x - 7 < 2$$

$$5 < 5x < 9$$

$$1 < x < \frac{9}{5}$$

The solution set is the interval $\left(1, \frac{9}{5}\right)$

32. Write the equation of the line with slope $\frac{7}{5}$ and y-intercept 9. Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.

Use $y = mx + b$ to obtain $y = \frac{7}{5}x + 9$

33. Write the equation of the line through (3,-2) with slope 5. Express the equation in slope intercept form. Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.

$$\text{Use } y - y_1 = m(x - x_1)$$

$$y + 2 = 5(x - 3) = 5x - 15$$

$$y = 5x - 17$$

34. Calculate the distance between (-3, 5) and (2, -4). Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = \sqrt{(2 + 3)^2 + (5 + 4)^2} = \sqrt{(5)^2 + (9)^2} = \sqrt{106}$$

35. Calculate the slope of the line through (-3, 5) and (2, -4). Reduce all fractions in your answer. Don't use mixed numbers. Don't use decimals. Improper fractions are just fine.

$$m = \frac{y_1 - y_2}{x_1 - x_2} = \frac{-4 - 5}{2 + 3} = -\frac{9}{5}$$