

Meramec Intermediate Algebra Chapter 3 TEST 3

Summer 2010

NAME: _____ Score _____ /100

Please print

SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Course Average _____

No Decimals No mixed numbers No complex fractions No boxed or circled answers

Questions 1 – 25 are 2 pts each.

1. **T** F In the rectangular coordinate system (Cartesian coordinate system) the horizontal number line is usually called the x-axis.
2. T **F** Each ordered pair of real numbers can correspond to two points in the Cartesian coordinate system.
3. T **F** Graphs of Equations and Inequalities in two variables appear on the Real Number Line.
4. T **F** If both sides of an equation are multiplied by any expression, the resulting equation is equivalent to the original equation.
5. **T** F To graph a linear equation in two variables it is only necessary to plot two points on the graph and draw the line through those points.
6. T **F** A horizontal line has no slope. **Be careful. Think.**
7. **T** F The graph of every linear equation in two variables is a non-vertical line.
8. **T** F If any expression is added to both sides of an inequality the resulting inequality is equivalent to the original inequality.
9. **T** F The second coordinate of a point in Quadrant II is positive.
10. T **F** The graph of every linear inequality in two variables is a non-vertical line.
11. In the rectangular coordinate system (Cartesian coordinate system) the point of intersection of the two number lines is called the **origin** of the coordinate system
12. An ordered pair (x, y) of real numbers is a **solution** of an equation in two variables if the coordinates satisfy the equation.
13. If any expression is added to both sides of an equation the resulting equation is **equivalent** to the original equation.
14. Pythagorean Theorem: If a and b are the lengths of the legs of a right triangle with hypotenuse of length c, then **$a^2 + b^2 = c^2$** .
15. A point is on the x-axis if and only if its **second** coordinate is zero.
16. If both sides of an inequality are multiplied by the same negative real number and the inequality symbol is **reversed**, the resulting inequality is **equivalent** to the original inequality.
17. A linear equation in two variables is an equation that can be written in the form **$y = mx + b$** where m and b are real numbers.

18. 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** curve for the inequality.

19. Two non-vertical lines are **parallel** if they have the same slope and different y-intercepts.

20. A solution of an equation in two variables is an **ordered pair** of Real Numbers.

WARNING: Especially for Questions 21 – 25, it is essential that you remember a formula must contain an = symbol.

21. The midpoint of the line segment joining two points (x_1, y_1) and (x_2, y_2) is given by the formula:

$$\text{midpoint is } \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

22. The distance d between two points (x_1, y_1) and (x_2, y_2) is given by the formula:

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

23. The equation of a circle with radius r and center at the origin is:

$$x^2 + y^2 = r^2$$

24. The slope of the line through two points (x_1, y_1) and (x_2, y_2) is given by the formula:

$$m = \frac{y_1 - y_2}{x_1 - x_2} \quad \text{Alternately } m = \frac{y_2 - y_1}{x_2 - x_1}$$

25. The point-slope form of the equation of a line is:

$$y - y_1 = m(x - x_1)$$

Questions 26 – 35 are 5 pts. each.

26. Write the equation of the circle with center at $(3, -5)$ which has radius 4.

$$\text{Use } (x - h)^2 + (y - k)^2 = r^2$$

$$(x - 3)^2 + (y + 5)^2 = 4^2$$

27. Write the equation, in slope-intercept form, of the line with slope $\frac{2}{5}$ and y-intercept $\sqrt{3}$.

$$y = \frac{2}{5}x + \sqrt{3}$$

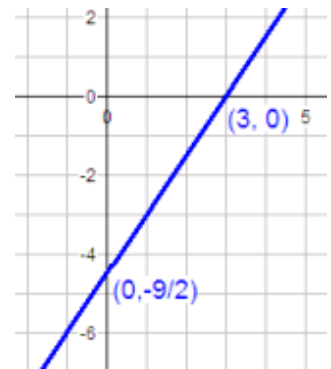
28. Write the equation $y - 5 = \frac{3}{8}(x + 1)$ in slope-intercept form. **Show the steps**

$$\begin{aligned}
 y - 5 &= \frac{3}{8}(x + 1) \\
 y &= \frac{3}{8}x + \frac{3}{8} + 5 \\
 &= \frac{3}{8}x + \frac{43}{8}
 \end{aligned}$$

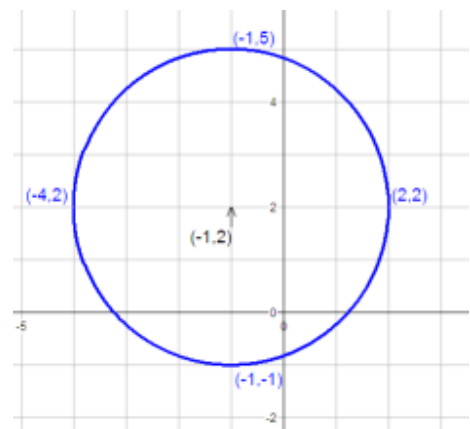
29. Sketch the graph of $3x - 2y = 9$. **Show your calculations. Label x and y intercepts with their coordinates.**

If $y = 0$, then $x = 3$. Therefore the x-intercept is $(3, 0)$.

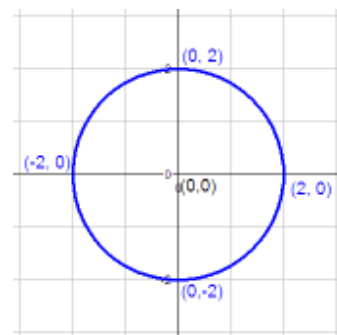
If $x = 0$, then $y = -\frac{9}{2}$. Therefore the y-intercept is $(0, -\frac{9}{2})$



30. Sketch the graph of $(x + 1)^2 + (y - 2)^2 = 9$. **Label (with coordinates) the points at the ends of the vertical and horizontal diameters. Label (with coordinates) the center of the circle.**



31. Sketch the graph of $x^2 + y^2 = 4$. **Label x and y intercepts with their coordinates. Label the center of the circle with its coordinates.**



32. What is the slope of the line whose equation is $5x - 8y = 11$. **Show your work.**

$$5x - 8y = 11$$

$$-8y = -5x + 11$$

$$y = \frac{5}{8}x - \frac{11}{8}$$

$$\text{The slope is } \frac{5}{8}$$

33. Find the equation of the line through $(-3, 1)$ with slope 5. Write the equation in slope-intercept form. **Show your work. If you are going to use a formula, state the formula, then use it.**

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

$$y - 1 = 5(x + 3)$$

$$y = 5x + 15 + 1$$

$$= 5x + 16$$

34. Find the equation of the line through $(2,3)$ and $(5,5)$. **Show your work. If you are going to use a formula, state the formula, then use it. Write the equation in slope-intercept form.**

$$\text{Use } m = \frac{y_1 - y_2}{x_1 - x_2} \text{ to calculate } m = \frac{5 - 3}{5 - 2} = \frac{2}{3}$$

$$\text{Use } y - y_1 = m(x - x_1) \text{ and the point } (2, 3)$$

$$y - 3 = \frac{2}{3}(x - 2)$$

$$y = \frac{2}{3}x - \frac{4}{3} + 3$$

$$= \frac{2}{3}x + \frac{5}{3}$$

$$\text{Alternately use } y - y_1 = m(x - x_1) \text{ and the point } (5,5)$$

$$y - 5 = \frac{2}{3}(x - 5)$$

$$y = \frac{2}{3}x - \frac{10}{3} + 5$$

$$= \frac{2}{3}x + \frac{5}{3}$$

35. Consider the inequality $3x - 2y > 18$.

a. What is its boundary equation? **$3x - 2y = 18$**

b. Should its graph be dashed or solid? **dashed**

c. Sketch the graph of the boundary equation. **Show your calculations. Label x and y intercepts with their coordinate.**

If $x = 0$, then $y = -9$. So the y-intercept is $(0, -9)$.

If $y = 0$, then $x = 6$, so the x-intercept is $(6, 0)$

d. Choose a test point. **$(0, 0)$ is the best choice.** Any point not on the boundary line is acceptable.

e. Test your test point in $3x - 2y > 18$.

$3(0) - 2(0) > 18$ is FALSE

f. Do you get a true statement or a false statement? **False**

g. Shade the graph of the inequality $3x - 2y > 18$.

