Meramec Intermediate Algebra Chapter 4&Sections 5.1-5.4 TEST 4
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 – 30 are 2 pts each. Questions 31 – 38 are 5 pts each.

1. **T** F A system of equations consists of two or more equations involving the same variables.
2. **T** F In a system of linear equations, if the value of one of the variables is known, an equivalent system is generated if that value is substituted into the equations.
3. T **F** In a system of linear equations, an equivalent system is generated if the same number is substituted for x in all the equations.
4. **T** F If two intersecting linear equations in two variables are added, the graph of the third equation (the sum) intersects the two original graphs at their intersection point.
5. **T** F The solution set for a system of linear inequalities in two variables can be the empty set ∅.
6. T **F** 17.325×10^{-23} is an example of a number written in scientific notation.
7. T **F** $(2 \times 10^{15})(3 \times 10^{15}) = 6 \times 10^{15}$.
8. T **F** The sum of two terms is a term.
9. T **F** A second degree polynomial is called a binomial.
10. T **F** $(x + 5)^2 = x^2 + 25$.
11. In a system of linear equations, replacement of an equation with an **equivalent** equation produces a system which is **equivalent** to the original system.
12. The solution of a system of two equations in two variables is the **ordered pair** of numbers that make both equations true.
13. A **term** is a letter, a number, or a product of letters and numbers.
14. A **polynomial** is a term or a sum of terms in which all variables have whole number exponents.
15. The **leading term** of a polynomial is the term with largest degree.
16. Two polynomials are **equal** if they have the same degree and corresponding coefficients are equal.
17. The product of two polynomials is a polynomial obtained by multiplying **each** term of the first times **each** term of the second and adding like terms.
18. A negative number with an odd exponent is a **negative** number.
19. In the exponential expression -5^{14} the base is **5**.
20. What is the leading coefficient of $5x^3 - 7x^9 + 23x + 4$? **-7**.
21. What is the constant term of $5x^3 - 7x^9 + 23x + 4$? **4**.
22. **Product of Exponentials:** If m, n and a are real numbers then $a^m a^n = \mathbf{a^{m+n}}$.
23. Evaluate $4x^0 + 5 =$ **9**.

24. Evaluate $-3^2 =$ **-9**.

25. Evaluate $2^{-3} = \frac{1}{8}$.

26. Write 3.76543×10^8 in standard form. **376,543.000**.

27. Write 0.0000789 in scientific notation. 7.89×10^{-5}.

28. Write the opposite of $8x^5$. **$-8x^5$**.

29. Write the opposite of $3x^2 - 2x + 1$. **$-3x^2 + 2x - 1$**.

30. Compute the sum of $3x^4$ and $7x^4$. **$10x^4$**

31. Compute the product $(x + 5)(3x^2 + 2x - 1)$. **$3x^3 + 17x^2 + 9x - 5$**.

$(x + 5)(3x^2 + 2x - 1) = 3x^3 + 2x^2 - x + 15x^2 + 10x - 5 = 3x^3 + 17x^2 + 9x - 5$

32. Is the ordered pair (2, –1) a solution of the system $\begin{cases} x - y = 3 \\ 2x - 4y = 8 \end{cases}$. Justify your answer.

Substitute (2, –1) into $x - y = 3$ to obtain $2 - (-1) = 3$ which is TRUE.

Substitute (2, –1) into $2x - 4y = 8$ to obtain $2(2) - 4(-1) = 8$ which is TRUE.

Therefore (2, –1) is a solution to the system.

33. Is the ordered pair (4, 2) a solution of the system $\begin{cases} 2x - 5y = -2 \\ 3x + 4y = 4 \end{cases}$. Justify your answer.

Substitute (4, 2) into $2x - 5y = -2$ to obtain $2(4) - 5(2) = -2$ which is TRUE.

Substitute (4, 2) into $3x + 4y = 4$ to obtain $3(4) + 4(2) = 4$ which is FALSE.

Therefore (4, 2) is NOT a solution to the system.

34. Solve the system $\begin{cases} 6x - y = -5 \\ 4x - 2y = 6 \end{cases}$

$$\begin{cases} 6x - y = -5 \\ 4x - 2y = 6 \end{cases} \longrightarrow \begin{cases} y = 6x + 5 \\ 4x - 2y = 6 \end{cases} \longrightarrow \begin{cases} y = 6x + 5 \\ 4x - 2(6x + 5) = 6 \end{cases} \longrightarrow \begin{cases} y = 6x + 5 \\ -8x - 10 = 6 \end{cases}$$

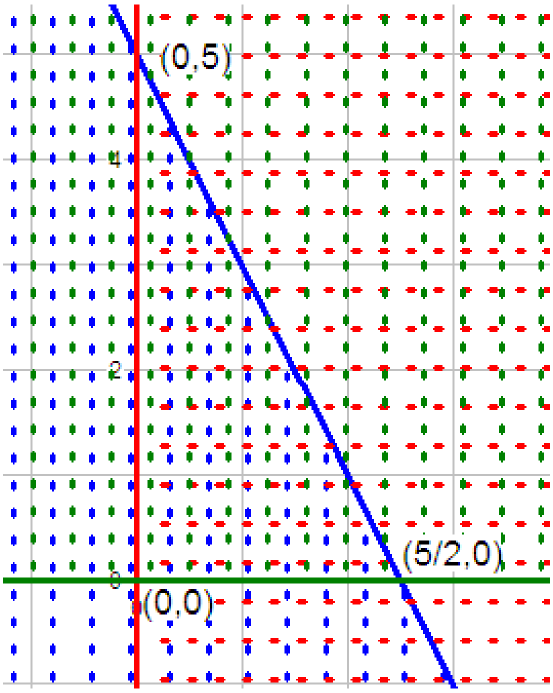
$$\longrightarrow \begin{cases} y = 6x + 5 \\ x = -2 \end{cases} \longrightarrow \begin{cases} y = 6(-2) + 5 \\ x = -2 \end{cases} \longrightarrow \begin{cases} y = -7 \\ x = -2 \end{cases}$$

The solution for the system is the ordered pair (–2, –7) .

35. Simplify. Use positive exponents only to write your answer. $\left(\frac{3x^2y}{y^{-9}z}\right)^{-2}$

$$\left(\frac{3x^2y}{y^{-9}z}\right)^{-2} = \frac{3^{-2}x^{-4}y^{-2}}{y^{18}z^{-2}} = \frac{z^2}{9x^4y^{20}}$$

36. Sketch the graph of the system $\begin{cases} 2x + y \le 5 \\ x \ge 0 \\ y \ge 0 \end{cases}$



Show your work. Label important points. Identify boundary equations.

The boundary equation for 2x + y ≤ 5 is 2x + y = 5.
If x = 0, then y = 5. Therefore the y-intercept is (0,5).

If y = 0, then x = $\frac{5}{2}$**. Therefore the x-intercept is** $\left(\frac{5}{2}, 0\right)$**.**

This boundary line is drawn as a solid line to indicate it is part of the solution set for the system.

The boundary line for x ≥ 0 is x = 0, the y-axis. Clearly x ≥ 0 means the half-plane to the left of the y-axis.
The boundary line for y ≥ 0 is y = 0, the x-axis. Clearly y ≥ 0 means the half-plane above of the x-axis.

Test (0,0) in the inequaltity 2x + y ≤ 5 to obtain 2(0) + 0 ≤ 5 which is TRUE.
Therefore the solution set for 2x + y ≤ 5 is the half-plane bounded by 2x + y = 5 containing the origin.

The intersection of these three individual solution sets is the solution set for the system. That intersection is the triangular region with vertices (0, 0), (0,5), and $\left(\frac{5}{2}, 0\right)$ **including its edges.**

37. The graph of a system of inequalities is shown in Fig. 1. What system of equations must be solved to determine the coordinates of the vertex labeled A?
Use the names Red Eq., Blue Eq., and Green Eq. to specify the system. Obviously you are not expected to solve the system.

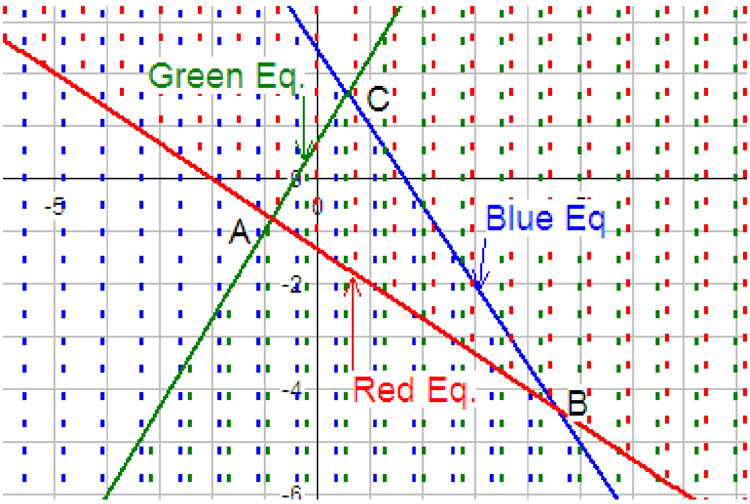


Fig. 1

Solve the system $\begin{cases} \text{Red Eq} \\ \text{Green Eq} \end{cases}$

38. Perform the indicated long division.

$$\begin{array}{r} x^2 + 3x \\ x^2 + 3x + 2 \overline{\big) x^4 + 6x^3 + 11x^2 + 6x} \\ \underline{x^4 + 3x^3 + 2x^2} \\ 3x^3 + 9x^2 + 6x \\ \underline{3x^3 + 9x^2 + 6x} \\ 0 \end{array}$$