MATH 108                FINAL EXAM                NAME _______________________
Fall 2012                Z-NUMBER ___________________                     
SECTION ___________________

PART I: TRUE or FALSE
Circle TRUE or FALSE, whichever is correct. (2 points each)

1. \(5^0 = 1\)  TRUE    FALSE

2. To find the \(y\)-intercept(s) of a graph, we set \(y = 0\), and solve for \(x\). TRUE    FALSE

3. \(12 \div 2 \cdot 6 = 36\)   TRUE    FALSE

4. If \(-3x < 12\), then \(x > -4\). TRUE    FALSE

5. \(4^{-2} = -16\)    TRUE    FALSE

PART II: FILL-IN-THE-BLANK (2 points each)

6. Give an example of an integer that is not a whole number. Answer _________

7. (Reduce to lowest terms) \(\frac{60}{36} = \) _________

8. \(4 + 2 \cdot 5 = \) _________

9. 15\% of what number is 24? Answer _________
10. Use the property listed to fill in each blank.

(a) Commutative property $(\cdot)$
\[ x \cdot y = \underline{\hspace{2cm}} \]

(b) Associative property $(+)$
\[ (x + y) + 3 = \underline{\hspace{2cm}} \]

(c) Distributive property
\[ 5(x - 4) = \underline{\hspace{2cm}} \]

(d) Identity property $(+)$
\[ 6 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \]

11. Write each number in scientific notation.

(a) 43,000 = \underline{\hspace{4cm}}

(b) 0.005 = \underline{\hspace{4cm}}

12. Write each number in standard notation.

(a) $2.7 \times 10^2 = \underline{\hspace{5cm}}$

(b) $3 \times 10^{-1} = \underline{\hspace{5cm}}$

PART III: MULTIPLE CHOICE

Circle the correct response. (2 points each)

13. Evaluate for $x = 12$ and $y = -3$.
\[ \frac{3x}{y^2 - y} \]

(a) $-7$ \hspace{2cm} (d) 1

(b) $-1$ \hspace{2cm} (e) None of these.

(c) 7
14. Which of the following is an irrational number?

(a) $\frac{3}{4}$  
(b) $0.\overline{3}$  
(c) $\sqrt{2}$

(d) All of these  
(e) $a$ and $b$ only

PART IV: For problems 15 - 28, you must show all your work clearly on the exam for full credit. You must circle your final answer!! (5 pts. each unless otherwise specified.)

15. Solve each equation.

(a) $\frac{3x}{2} + 4 = 7$  
(b) $\frac{2x - 1}{3} = -5$

(c) $5(x - 4) = 5x + 9$  
(d) $2(x + 2) - 6 = 4(x - 1) - 3x$
16. The length of a rectangle is two feet less than twice the width. If the perimeter is 116 feet, find the dimensions of the rectangle.

17. Solve for the indicated variable.

\[ A = \frac{1}{3}BC \; ; \; \text{for } B \]
18. Solve each inequality and graph the solution set.

(a) \(-4x + 3 < 15\)

\[ -4x + 3 < 15 \]

(b) \(1 < 3x - 2 \leq 7\)

\[ 1 < 3x - 2 \leq 7 \]
19. Consider the following equation.

\[ 3x + 2y = 6 \]

(a) [4 pts.] Find the \( x \)-intercept. 
(b) [4 pts.] Find the \( y \)-intercept.

\[ x \text{-intercept: ( , ) } \quad y \text{-intercept: ( , )} \]

(c) [4 pts.] Using the intercept method, graph \( 3x + 2y = 6 \) in the rectangular coordinate system below.
20. Graph the following equation. \( y = -2 \)

![Graph of y = -2](image)

21. Use the substitution method to solve the following system of equations.

\[
\begin{align*}
2x + 3y &= 1 \\
-x + y &= -3
\end{align*}
\]
22. Use the addition (elimination) method to solve the following system of equations.

\[
\begin{align*}
2x - 3y & = 13 \\
5x + 2y & = 4
\end{align*}
\]

23. Children can buy tickets to a movie for $3. The admission for adults is $5. If 150 tickets are sold and the total receipts are $630, how many of each type of ticket are sold?
24. Simplify each expression. Write each answer without using parentheses or negative exponents.

a.) \((-5x^3)^2\)  

b.) \(\frac{x^3x^2}{x^2x^{-2}}\)

c.) \((x^2y^{-4})^5\)

d.) \(\left(\frac{x^3}{x-1}\right)^{-2}\)

25. Perform the indicated operations and simplify.

\[4(x^2 - 3x) + (5x + 6) - (x^2 + 2x - 1)\]
26. Perform the indicated operations and simplify.

(a) \( 4x^2(2x^2 - 5x + 3) \)

(b) \( (5x - 3)(4x + 2) \)

(c) \( (2x - 5)^2 \)

(d) \( (3x + 2)(x^2 - 4x + 6) \)
27. Divide using the method of long division.

(a) Divide \(2x^2 - 9x - 8\) by \(2x + 3\)

(b) Divide \(x^3 + 4x^2 - 10\) by \(x - 2\)
28. Factor completely each expression.

(a) \(3xy^2 - 12x^2y + 6x^2y^2\)  
(b) \(x^2 - 81\)

(c) \(5x^2 - 5xy + 2x - 2y\)  
(d) \(25x^2 - 16y^2\)

(e) \(x^2 - x - 30\)  
(f) \(3x^2 + 7x - 6\)

(g) \(x^3 + 3x^2 - 4x - 12\)