Math 50 - *Elementary Algebra*
Final Exam, Fall 2011

Name: _____ Date: _____ Score: _____/100

Show the necessary work on the test copy. For any of the graphs use a straight-edge to receive full credit. Place your answers in the blanks provided to the right of the problem. The points for each problem are to the right of the blank.

1. Write the following phrase as an algebraic expression and simplify if possible. Let x represent the unknown number.

   "*The quotient of 6 times a number and 2 added to twice the number.*" _____ (1)

   (simplified) _____ (1)

2. Solve each equation.

   (a) $-x + 2(x - 1) = 3x + 4$ _____ (2)

   (b) $0.5x + 1.2 = 0.6 + 0.2x$ _____ (2)

   (c) $\frac{2}{5}x - 2 = \frac{3}{20}x$ _____ (2)

3. Solve $A = \frac{1}{2}h(a + b)$ for h. h = _____ (2)

4. A motorcycle traveling at 70 miles per hour overtakes a car traveling at 40 miles per hour that had a three-hour head start. How far from the starting point are the two vehicles given that they started from the same point?

_____ (3)

5. Solve.

$|x - 4| - 8 = -3$ _____ (3)

6. A store is advertising a 20% off sale on everything in the store. Find the discount and the discounted price of a painting that regularly sells for $280.

Dollar amount of discount: _____ (2)

Discounted price: _____ (1)

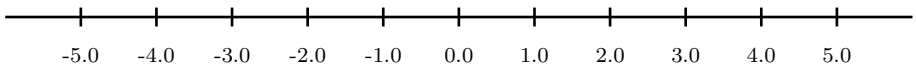
7. Claire has received scores of 85, 88, 87, and 80 on her algebra tests. What is the minimum score she must receive on the fifth test to have an overall test score average of at least 82? (Hint: The average of a list of numbers is their sum divided by the number of numbers in the list.) Express the situation as an inequality and then solve it.

Inequality: _____ (1)

Solution: _____ (2)

8. (a) Solve the compound inequality, write the solution in interval notation and (b) graph the solution set.

$-3 < 2 - x \leq 1$ (a) Interval: _____ (3)



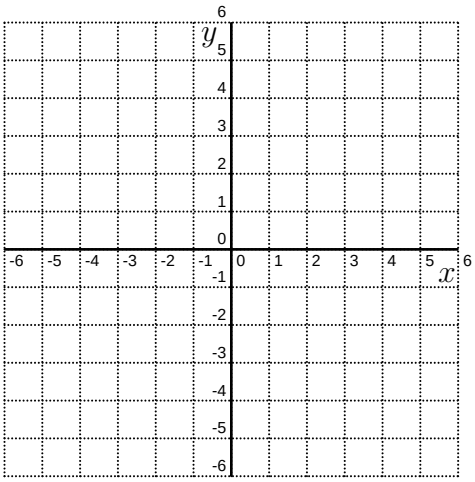
(b) Graph: (1)

9. Graph the linear equation by finding and plotting its intercepts.

$2x + y = -4$ x-Intercept: _____ (1)

y-Intercept: _____ (1)

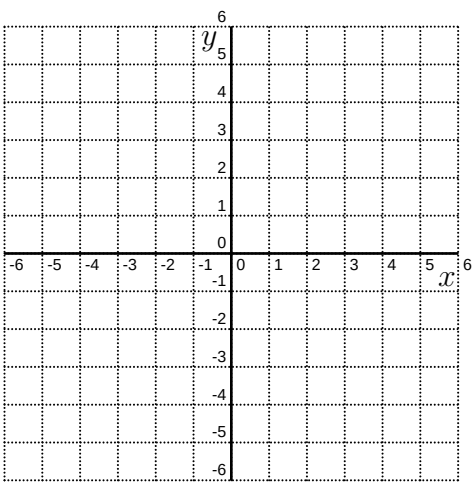
Graph: (2)



10. Graph the linear equation and find the slope of the line. Write 'N' if the slope is not defined.

$x = -2$ Slope: _____ (1)

Graph: (1)



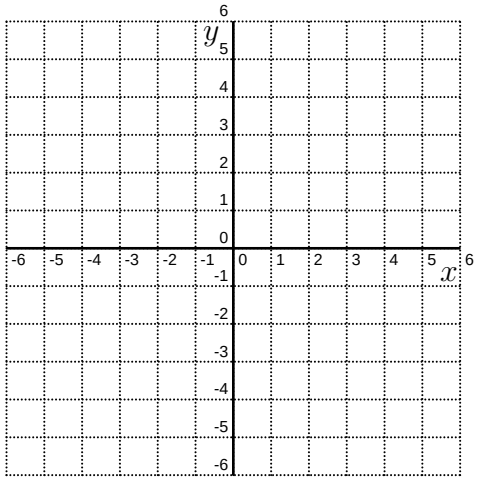
11. Find the slope and the y-intercept of the line. Use them to graph the equation.

$3x - 5y = -15$

Slope: _____ (1)

y-Intercept: _____ (1)

Graph: (2)



12. (a) Find the slope-intercept form of the line given by $-3x + 2y = 12$.

    (b) Is the line given by this equation parallel, perpendicular, or neither to the line given by the equation $1.5x - y = 8$?

(a) _____ (2)

(b) _____ (1)

13. Given $f = \{(-1, 4), (1, 2), (-1, 3), (5, 3)\}$.

State the domain. Domain: _____ (1)

State the range. Range: _____ (1)

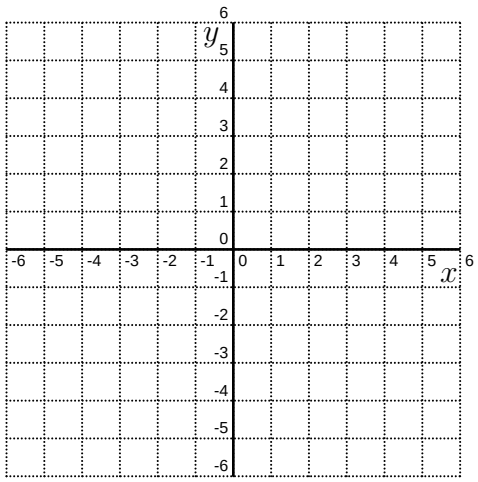
Is the relation a function? (Y/N): _____ (1)

14. Find the equation of the line that passes through $(1, -2)$ and $(3, 2)$. Your answer should use function notation, that is, $f(x) = ax + b$.

_____ (3)

15. Graph the nonlinear function $f(x) = x^2 - 3$. State the domain and the range of the function.

Graph: (3)



Domain: _____ (1)

Range: _____ (1)

16. Solve the system of equations by using a method of your choice. Write an ordered pair if there is one solution; otherwise, write 'N' if there is no solution or 'I' if there are infinitely many solutions.

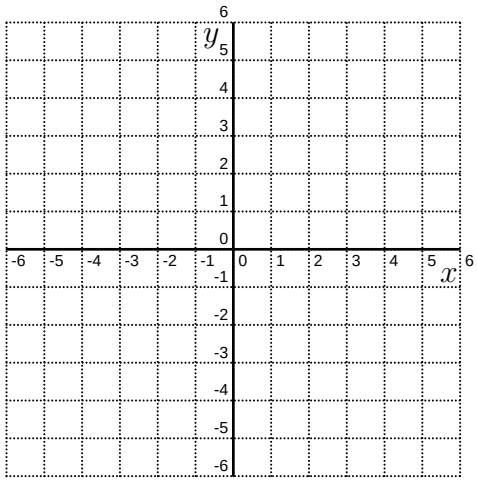
$$\begin{cases} 3x + y = 3 \\ -x + 2y = -8 \end{cases}$$

_____ (4)

17. Graph the solution of the system of linear inequalities.

$$\begin{cases} 3x + 2y \leq 6 \\ y > -4 \end{cases}$$

Graph: (5)



18. A chemist needs 70 milliliters of a 55% solution but has only 40% and 61% solutions available. Find how many milliliters of each should be mixed to get the desired solution. Use a system of equations where x represents the amount of 40% solution and y represents the amount of the 61% solution needed.

System of equations: (I) _____ (1)

(II) _____ (1)

Solution: _____ (3)

19. Convert from scientific to standard notation: 4.25×10^{-3}. _____ (1)

20. Simplify the following expressions, and write the results using positive exponents.

(a) $(0.2x^2)(4x^{-8})$ _____ (1)

(b) $\dfrac{2a^3(b^{-2})^7}{8ab^3}$ _____ (2)

(c) $\left(\dfrac{uv^{-1}}{5u^2v^3}\right)^{-4}$ _____ (3)

21. Perform the indicated operations.

(a) $(8x^2+7)-(-2x^2-7x+4)$ _____ (2)

(b) $2v^4(5-9v+3v^4)$ _____ (2)

(c) $(5x+3)(2x-7)$ _____ (2)

23. Continued: Perform the indicated operations.

(d) $(15a^3 - 3a + 6) \div (6a)$ _____ (2)

(e) $\dfrac{p^2 + 4p - 3}{p + 6}$ _____ (3)

22. Factor the following polynomials completely.

(a) $28x^5y^7 + 10x^5y$ _____ (2)

(b) $15a^2 - 10a + 12a - 8$ _____ (2)

(c) $m^2 - 7m - 30$ _____ (2)

24. Continued: Factor the following polynomials completely.

(d) $10y^2 + 8y - 2$ _____ (3)

(e) $5p^4 - 20p^2q^2$ _____ (3)

23. Solve the following polynomial equations.

(a) $z(6z - 5) = 4$ _____ (3)

(b) $2x^3 + 8x^2 - 10x = 0$ _____ (3)