PRACTICE TEST

Write in a neat and organized fashion. You should use a pencil. **For an exercise to be complete there needs to be a detailed solution to the problem. Do not just write down an answer. No proof, no credit given!**

1. Answer each question: (30 points)

a) What is the standard form of a linear equation in two variables? _____

c) What is the slope-intercept form of a line? _____

d) What is the point-slope form of a line? _____

e) When are two lines parallel? _____

f) When are two lines perpendicular? _____

g) What is the definition of the slope? _____

h) What is the standard form of a quadratic equation? _____

i) What is the quadratic formula? _____

j) Write the following statement mathematically and describe what it means (the definition of function).

y is a function of x _____

k) Complete each special product:

$(a+b)^2 =$ _____

$(a-b)^2 =$ _____

$a^2 - b^2 =$ _____

$a^3 + b^3 =$ _____

$a^3 - b^3 =$ _____

2. Do the following operations and graph the solution set: (6 points)

a) $[-3,6] \cup [-2,4]$

b) $[-3,6] \cap [-2,4]$

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3. Do the following: (8 points)

a) solve the inequalities;
b) graph the solution set on the number line;
c) use interval notation for the solution set.

a) $2 < 3x - 4 \leq 7$

b) $-3(3x + 4) \geq 21$

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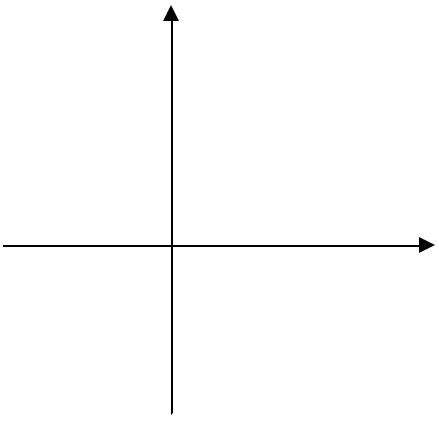
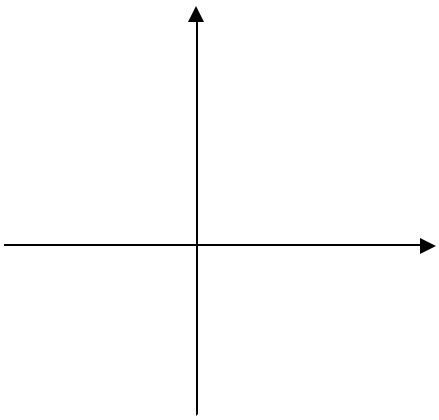
4. Graph the following equations on a rectangular coordinate system by the intercepts method .
Label the points and axes. (10 points)

a) $3x + 2y = 6$

b) $2x - y = 0$





5. Let $2x-3y=1$ be a linear equation in two variables. (8 points)

a) Complete each ordered pair so that it is a solution of the given equation:

i) $(?,-1)$

ii) $(2,?)$

c) What is the slope of the line?

d) Is the ordered pair (1,1) a solution of the equation?

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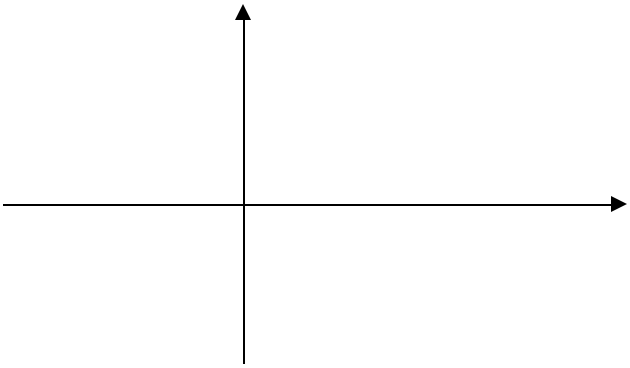
6. Graph the following equations on the same coordinate system. Label the points, the lines, and the axes. (8 points)

a) $2x=5$

b) $y-3=0$



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7. Do the following: (8 points)

a) Write an equation for the line that passes through the given point and has the given slope: $(2,3)$, m= 5.

b) put your equation into slope-intercept form;

c) put your equation in standard form.

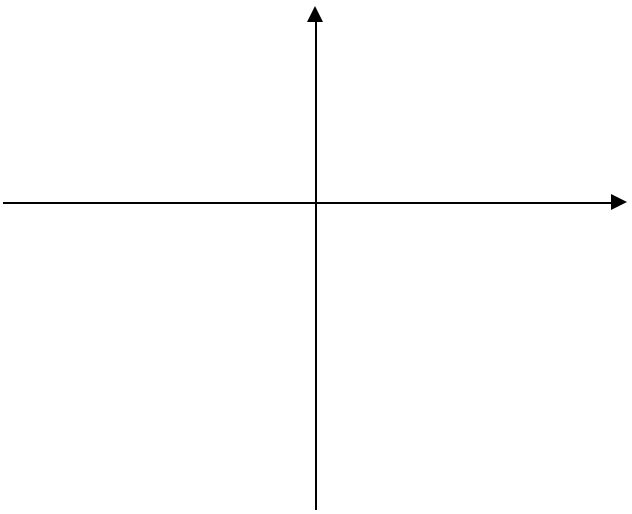
8. Solve the following systems of two linear equations and two variables using the substitution method or the addition method. (10 points)

a) $\begin{cases} 2x + y = 1 \\ 5x - y = 20 \end{cases}$

b) $\begin{cases} -5a = 15b + 1 \\ a + 3b = -5 \end{cases}$

9. Graph the following linear inequality in two variables: $y \geq 3x - 1$.

Show clearly how you obtain the boundary line and what test point you're using.
Label the points, line and axes used. (8 points)



10. Answer the following questions: (8 points)

x	*y*
0	1
2	3
1	0
3	2
5	4
6	7

a) Is the second variable y a function of the first variable x ? Explain why or why not <u>using the definition of function</u>.

b) If y is a function of x ($y = f(x)$), give the domain and the range.

Domain = _____ Range = _____

c) Find $f(0)$ and $f(4)$.

$f(0)$ = _____ $f(5)$ = _____

d) Solve $f(x) = 4$.

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11. Simplify the following expressions. Write the final answer with positive exponents only. (10 points)

a) $\dfrac{(xy)^{-3}(xy)^{6}}{(xy)^{-5}}$

b) $\left(\dfrac{a^{2}b^{3}}{a^{-2}b^{-3}}\right)^{-4}$

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12. Do the following operations: (10 points)

a) $\dfrac{4a}{a^{2}+3a+2}+\dfrac{2a-1}{a^{2}+6a+5}$

b) $\dfrac{\dfrac{1}{x+5}}{\dfrac{4}{x^{2}-25}}$

13. Simplify the following: (8 points)

a) $\left(2+3\sqrt{5}\right)^2$

b) $2\sqrt{24}-5\sqrt{54}+3\sqrt{20}$

14. Factor each expression completely. (18 points)

a) $12+4x+3y+xy$

b) $7m-14m^2$

c) $8x^2+23x-3$

d) $x^2-17x+66$

e) a^3-27

h) $50y^2-200$

15. Solve the following equations by factoring: (10 points)

a) $x^2-4x-12=0$

b) $3k^2+4k-4=0$

16. Solve the following equation by the square root property: (5 points)

$(4x-3)^2 - 9 = 0$

17. Solve the following equation by the quadratic formula: (5 points)

$2x^2 + 2x = 5$

18. Solve the following equation by completing the square: (5 points)

$3a^2 - 9a + 5 = 0$

19. Solve the following equations: (21 points)

a) $\sqrt{3x-5} = \sqrt{2x+1}$

b) $\sqrt{5x+11} = x+3$

c) $\frac{5x}{14x+3}=\frac{1}{x}$

d) $\frac{3x}{x^2+5x+6}=\frac{5x}{x^2+2x-3}-\frac{2}{x^2+x-2}$

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20. Solve each formula for the specified variable: (8 points)

a) $ax+by=c$ for y.

b) $V=\frac{1}{3}p r^2 h$ for h.

21. Rationalize each denominator: (8 points)

a) $\frac{1}{4+\sqrt{15}}$

b) $\frac{2\sqrt{3}}{\sqrt{6}}$

22. A boat can travel 20 miles against the current in the same time that it can go 60 miles with the current. The current is 4 mph. Find the speed of the boat in still water. (9 points)

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23. Mark and Luisa operate a small laundry. Luisa, working alone, can clean a day's laundry in 9 hours. Mark can lean a day's laundry in 8 hours. How long would it take them if they work together? (9 points)