MAT 121 Test 1, Fall, 2017 Name_____
100 Points Covers Chapter 1

All I want on this cover sheet is your NAME.

Do all work and put all answers on the white paper provided. Do not write on the backs of the white pages. Leave a margin at the top left corner on every page. "121-G81" works really well for the top left corner of every page.

Leave room between problems. Do not squeeze work in to fit a page. Start a fresh page. When in doubt on how long a problem will turn out to be, start a fresh page.

Find all real or imaginary solutions, #s 1 – 4.

1. (10 pts) $5x-1=3x+2$ (Give your answer as an improper fraction.)
2. (5 pts) $\frac{2}{7}x+\frac{12}{5}=\frac{1}{2}$ (Give your answer as an improper fraction.)
3. (5 pts) $6x^2=47$ (Give your answer in simplified radical form.)
4. (5 pts) $3x^2-28x+67=0$ (Give your answer in simplified radical form.)

#s 5 – 7. Compute the discriminant for the following equations. Tell me what it says about the solutions of the equations, *without solving the equations*. How many distinct solutions, how many real zeros. If you can predict rational solutions, that's worth some extra points.

5. (5 pts) $9x^2+12x+4=0$
6. (5 pts) $4x^2-20x+29=0$
7. (5 pts) $6x^2=47$

Solve by factoring: You can use a "cheat," so long as you show understanding of the connection between solutions and factors.

8. (10 pts) $x^2-3x-28=0$
9. (5 pts) $8x^2+22x-105=0$

Solve #s 10 and 11 by completing the square. Leave all answers in (*exact*) simplified radical form.

10. (5 pts) $x^2+4x+9=0$
11. (5 pts) $5x^2+6x-9=0$

Now for lines:

12. Find an equation in point-slope form through the point $(5,-17)$ of the line that is…
    a. (5 pts) … parallel to $y=\frac{2}{3}x+13$
    b. (5 pts) … perpendicular to $y=\frac{2}{3}x+13$
13. Sketch the graphs of the two lines on the same set of axes:
    a. (5 pts) $x=7$
    b. (5 pts) $y=-2$
14. Sketch the graph of $3x-5y=15$. I'll know if you've been paying attention by the features you include and the features you don't waste our time on.

15. Solve the absolute value inequalities:
    a. (10 pts) $|2x-7|\le 5$

b. (5 pts) $|-2x+7|<5$

c. (5 pts) $|2x+7|+3\geq 5$

d. (5 pts) $|5x-3|+6<3$

16. (5 pts) SET UP THE FOLLOWING WORD PROBLEM. Do not solve.
How much 37% alcohol solution must be added to a solution of 75% alcohol to obtain 50 gallons of a mixture that is 50% alcohol?

17. (5 pts) SET UP THE FOLLOWING WORD PROBLEM. Do not solve.
Jennifer won big on the Price Is Right. It was her 15 minutes of fame. After she paid half of her windfall in taxes, she invested a third of what was left in Municipal bonds that yielded 3% after one year, and the other two-thirds on a stock that she sold for an 8% profit, after one year. If her returns on her investments yielded $950 total, after one year, how much did she win, before taxes?

BONUS SECTION: Work any 3 bonus questions for up to 15 bonus points.

1. (5 pts) Tamara can do a job in 6 hours that it takes Bill 10 hours to finish. How long does it take them to finish the job, if they work together? I want the *solution*, here. Leave it as a fraction.

2. (5 pts) Suppose in the previous problem, Tamara thinks she's such hot stuff that she starts work 2 hour late, and *then* joins Bill and they work together the rest of the way. How many hours do each of them work? I want the *solution*, here. Leave it as a fraction.

3. (5 pts) Sketch the graph of $y=-5x+4$. I expect to see *x*- and *y*-intercepts.

4. (5 pts) Re-write the function $f(x)=3x^2+4x+9$ in the form $f(x)=a(x-h)^2+k$.

5. (5 pts) Find all real solutions to the equation $5\sqrt{x+3}=x+5$. (Leave answer in simplified radical form.)