MAT 121 Test 1, Fall 2016 Name_____
100 Points Covers Chapter 1

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

1. (10 pts) $2x-11=5x+12$
2. (5 pts) $\frac{3}{4}x-\frac{1}{5}=\frac{5}{6}$
3. (5 pts) $3x^2=-7$
4. (5 pts) $4x^2+4x-2=0$ (Leave 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) $9x^2-30x+32=0$
6. (5 pts) $49x^2+154x+121=0$
7. (5 pts) $10x^2+x-21=0$

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

8. (10 pts) $x^2-9x+18=0$
9. (5 pts) $10x^2+x-21=0$

Solve #s 10 and 11 by completing the square.

10. (5 pts) $x^2+10x-11=0$
11. (5 pts) $2x^2-3x-7=0$

Now for lines:

12. Find an equation in point-slope form through the point $(-2,3)$ of the line that is…
    a. (5 pts) … parallel to $y=-2x+177$
    b. (5 pts) … perpendicular to $y=-2x+177$
13. Sketch the graphs of the two lines on the same set of axes:
    a. (5 pts) $x=5$
    b. (5 pts) $y=-2$
14. Sketch the graph of $3x-2y=12$. 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) $|3-2x|>7$
    b. (5 pts) $|3-2x|\le 7$
    c. (5 pts) $|3-2x|+9>7$
    d. (5 pts) $|3-2x|+9<7$
16. (5 pts) SET UP THE FOLLOWING WORD PROBLEM. Do not solve.
    How much 35% alcohol solution must be added to 20 gallons of 78% alcohol solution to obtain a mixture that is 50% alcohol?

17. (5 pts) SET UP THE FOLLOWING WORD PROBLEM. Do not solve.
Bill can do a job in 6 hours that it takes Tom 8 hours to finish. How long does it take them to finish the job, if they work together?

BONUS SECTION:

18. (5 pts) Suppose in the previous problem, Bill thinks he such hot stuff that he starts work 1 hour late, and *then* joins Tom 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.

19. (5 pts) Re-write the function $f(x) = x^2 - 8x - 5$ in the form $f(x) = a(x-h)^2 + k$

a. State the vertex of this parabola.