Math 1050, Exam #5, Spring 2014 Name KEY

Instructions: Show all work. If you are using your calculator to solve, you may sketch a graph or indicate keys pressed to show work. Exact values: do not use decimals in your answers unless the problem begins with decimals, or is a word problem. All answers should be fully reduced for full credit. Draw diagrams to help organize the data (this is worth partial credit). If you do your work on scrap paper, you should indicate that directly on the test paper along with your final answer. It is preferable, if you can, to do work directly on the test.

1. Solve the following equations by hand for all values of the variable that will make the equation true. (7 points each)
   a. $(n-5)(n+3) = n+3$

$(n-5)(n+3) - (n+3) = 0$

$(n+3)(n-5-1) = 0$

$(n+3)(n-6) = 0$ $\quad n+3=0$ $\quad n-6=0$

$n = -3, \; n = 6$

$n = \{-3, 6\}$

   b. $(b+1)(b-2)(b+3) = 0$

$b+1=0 \Rightarrow b=-1$

$b-2=0 \Rightarrow b=2$

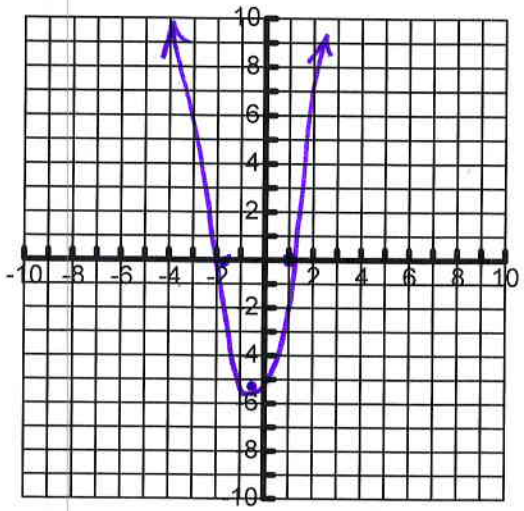
$b+3=0 \Rightarrow b=-3$

$b = \{1, 2, -3\}$

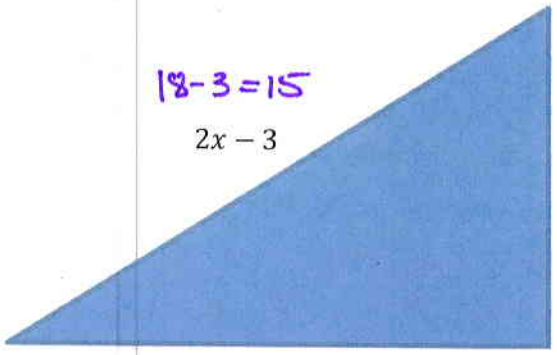
2. Solve the equation $3x^2 + 2x - 5 = 0$ graphically. Sketch the equation you obtain from your calculator on the graph below and label the solutions. (8 points)

$x = \{1, -5/3\}$

$\approx \{1, -1.67\}$



3. Find the lengths of the sides of a right triangle whose two perpendicular sides are x and x+3, and the hypotenuse is 2x-3. (10 points)



$(x+3)^2 + x^2 = (2x-3)^2$

$x^2+6x+9+x^2 = 4x^2-12x+9$

$2x^2+6x = 4x^2-12x$

$0 = 2x^2-18x$

$0 = 2x(x-9)$

$x=0$ not a possible solution $x=9$

4. Find three consecutive odd integers such that the product of the first and the third is 96. (10 points)

$x, x+2, x+4$

$x(x+4)=96$

$x^2+4x-96=0$

$(x+12)(x-8)=0$

$x=-12, x=8$

$-12, -10, -8$

$8, 10, 12$

trouble is, these are not odd.

∴ no such set of odd integers

5. Factor the polynomials completely. If it cannot be factored, write **prime**. (7 points each)

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

$y(x+3)+4(x+3)$

$=(y+4)(x+3)$

b. $p^2-8p+12$

$(p-6)(p-2)$

c. $t^2+2t-38$

Prime

only factors of 38 are 2, 19 & 1, 38

none have a difference of 2

d. $12n^2 + 19n + 5$ $12 \times 5 = 60$

$12n^2 + 15n + 4n + 5$

$3n(4n+5) + 1(4n+5)$

$(3n+1)(4n+5)$

e. $k^8 - 256$

$(k^4-16)(k^4+16)$

$(k^2-4)(k^2+4)(k^4+16) = (k-2)(k+2)(k^2+4)(k^4+16)$

f. $x^3y^3 + 1$

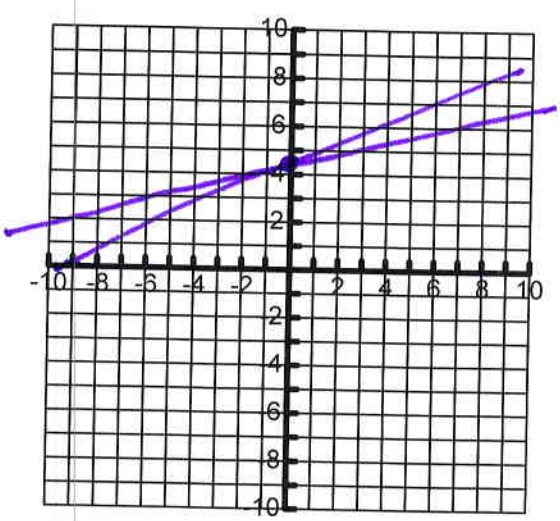
$(xy+1)(x^2y^2 - xy + 1)$

g. $4z^2 - 12z + 9$

$(2z-3)^2$

6. Solve the equation $\frac{2x-3}{4} + 5 = \frac{3(x+3)}{4} - \frac{x}{2} + 2$ graphically. Sketch the graph you obtain from your calculator on the graph below. Clearly state your solution. (9 points)

$X = \{0\}$



7. Solve the equation $\pi x + \sqrt{2} = \sqrt{3}(x - 7)$ graphically. (10 points)
   a. What did you set to be Y1?

$\pi X + \sqrt{2}$

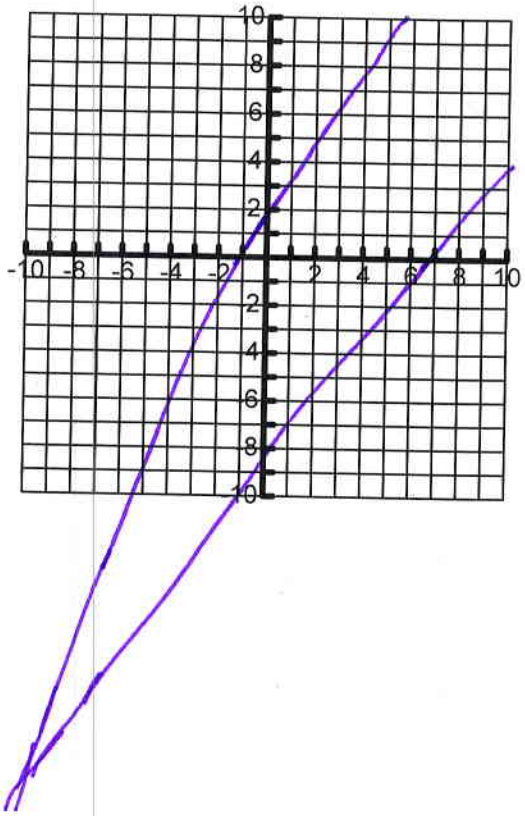
   b. What did you set to be Y2?

$\sqrt{3}(X-7)$

   c. State the solution of the equation rounded to two decimal places.

$X \approx -9.60$

   d. Sketch the graph you obtained from your calculator on the graph to the right.



the intersection is way off the standard window decrease Ymin to -30 to see it.