The University of Calgary
Department of Mathematics and Statistics
MATH 249 Lecture 03
Quiz # 1R

Fall 2005

Name:_____I.D.#:_____

1. Solve for x:

   $|3x+5| \leq |x+5|$. [3]

   both sides positive or zero ,square

   $9x^2+30x+25 \leq x^2+10x+25 \qquad 8x^2+20x \leq 0$

   $x(2x+5) \leq 0$ parabola open up ,negative between roots

   OR split points $x = 0, -\frac{5}{2}$ by testing

   $-\frac{5}{2} \leq x \leq 0 \qquad x \in \left[-\frac{5}{2}, 0\right]$.

2. Solve for x:

   $\dfrac{4}{x+2} \leq 2-x.$ [4]

   Everything on one side : $\dfrac{4}{x+2} - 2 + x \leq 0$,common denominator

   $\dfrac{4-2(x+2)+x(x+2)}{(x+2)} \leq 0, \dfrac{4-2x-4+x^2+2x}{(x+2)} \leq 0, \dfrac{x^2}{(x+2)} \leq 0,$

   split points $x = 0, -2$

   testing: $\underset{}{\overset{neg}{\text{———}}}\underset{-2}{\text{———}}\overset{pos}{\text{———}}\underset{0}{\text{———}}\overset{pos}{\text{———}}$

   Check the split points! $x = 0$ is also a solution

   The solution set is $]-\infty, -2[\cup \{0\}$.

3. Find an equation of the straight line perpendicular to the line $5x+2y=3$ passing through the centre of the circle $x^2+4x+y^2-6y=0$. [3]

   The given line could be written as $y = -\frac{5}{2}x + \frac{3}{2}$ so the slope is $-\frac{5}{2}$.

   Now for the perpendicular line the slope is negative reciprocal $m = \frac{2}{5}$.

   To find the centre we have to complete the squares: $x^2+4x = (x+2)^2 - 4$ and $y^2-6y = (y-3)^2 - 9$

   so the equation of the circle is $(x+2)^2 + (y-3)^2 = 13$

   and the centre is at the point $C(-2, 3)$.

   Together ,the new line : $y - 3 = \frac{2}{5}(x+2)$ or $\qquad 5y - 2x = 19.$