

## Math 418 - Activity 1

Work in groups on the following problems. Note that  $|x| = \sqrt{x^2}$  = the distance from  $x$  to 0. Please show all your work in your solutions to the problems below.

- 1 Convince yourself and your fellow students in your group that the two definitions of absolute value above are the same.
- 2 Solve  $2x - 3 \leq -4x + 5$
- 3 Solve  $\frac{4x-1}{5} > 3$
- 4 Solve  $|4x| < 5$
- 5 Solve  $|4x| > 5$
- 6 Solve the following inequality:  $|-2x + 4| - 5 \geq 11$ .
- 7 Solve  $|3x - 1| < 3$
- 8 Solve  $2x - 1 < 2x + 6$
- 9 Solve  $|3t^2| = 9$
- 10 Solve  $|4w - 2| = -8$
- 11 Solve  $|5z + 2| \geq 12$
- 12 Recall that we can define  $|x|$  = the distance from  $x$  to 0. Explain why  $|2x| = 5$  has two solutions using the definition of absolute value in terms of distance from 0.
- 13 Determine how many solutions each of the following inequalities has.
  - a)  $4x \leq 5x + 2$
  - b)  $3x - 2 + x > 14$
  - c)  $x + 2 < x - 1$
  - d)  $2x - 2 + x > 3x + 6$

- 14 Solve  $|x + 1| + |x - 2| = 3$
- 15 There are (at least) two ways to solve the previous equation, algebraically and thinking it through geometrically. Which way did you solve it? Solve it the other way.
- 16 Solve  $\frac{4x+3}{2x} > 3$
- 17 Solve  $\frac{4x+3}{2x-1} \leq 2$
- 18 Explain why an equation of the form  $|ax + b| = p$  where  $a \neq 0$  and  $p > 0$  will always have two solutions.