Can I Graph You, Too?

Introduction to Disjunction and Conjunction Notes

Name Key

Class _____

Consider the equation $|x| = 5$. To solve , you would graph both sides of the equations as functions ($y = |x|$ and $y = 5$) and mark the solution as the area where the graphs intersect.

* need to separate into 2 functions to show range of x & y values

The same method can be applied to inequalities.

- dashed line <, >
- solid line ≤, ≥

Follow the steps to solve the following inequalities

- Could solve w/ L & R and GOAL
- Graph each and the intersection is "#'s, Conjunction "and" between "V", disjunction "or" outside of "V"

Conjunction

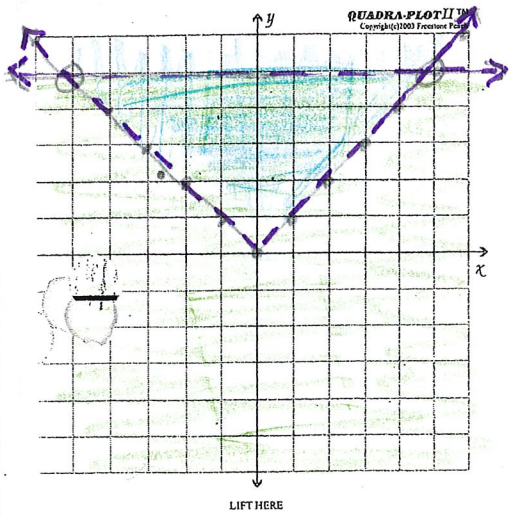
1. $|x| < 5$

$|x| < y$

$5 > y$

- graph the left side as $y > |x|$
- graph the right side as $y < 5$
- Sketch a graph of the function in the space to the right
- Find the intersection of the two lines and write the solution below:

$-5 < x < 5$



- Try points:

a) $(-2,1)$ $|-2| < 1$ $2 < 1$ and $5 > 1$ — no, not in double shaded area

b) $(1,6)$ $|1| < 6$ $1 < 6$ and $5 > 6$ — no, not in double shaded area

c) $(6,1)$ $|6| < 5$ $6 < 5$ no and $5 > 1$ — no, not in double shaded area

d) $(0,2)$ $|0| < 2$ $0 < 2$ and $5 > 2$ — in double shaded area

▼ = > or ≥ * arrow all the way left of y=, hit enter to get the inequality symbol you want.

▲ = < or ≤

Disjunction

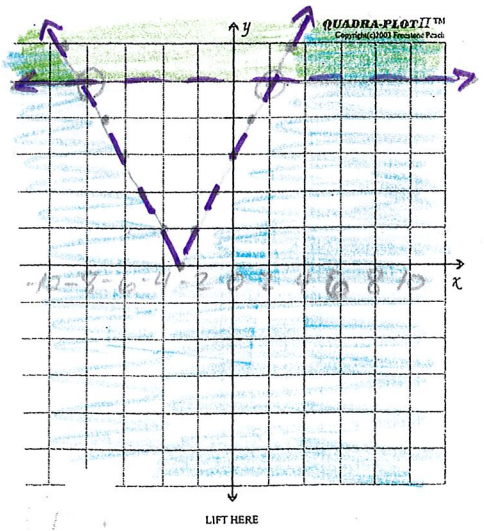
2. $|x + 3| > 5$

$|x+3| > y$

$5 < y$

- graph the left side as $y < |x + 3|$
- graph the right side as $y > 5$
- Sketch a graph of the function in the space to the right
- Find the intersection of the two lines and write the solution below:

$x < -8$ OR $x > 2$



- Try points:

a) $(-6,1)$ $|-6+3| > 1$ $|-3| > 1$ $3 > 1$ and $5 < 1$ no — not in double shaded area

b) $(-3,6)$ $|-3+3| > 6$ $|0| > 6$ $0 > 6$ no and $5 < 6$ — not in double shaded area

c) $(6,6)$ $|6+3| > 6$ $|9| > 6$ $9 > 6$ and $5 < 6$ — in double shaded area

d) $(-9,4)$ $|-9+3| > 4$ $|-6| > 4$ $6 > 4$ and $5 < 4$ no

Disjunction

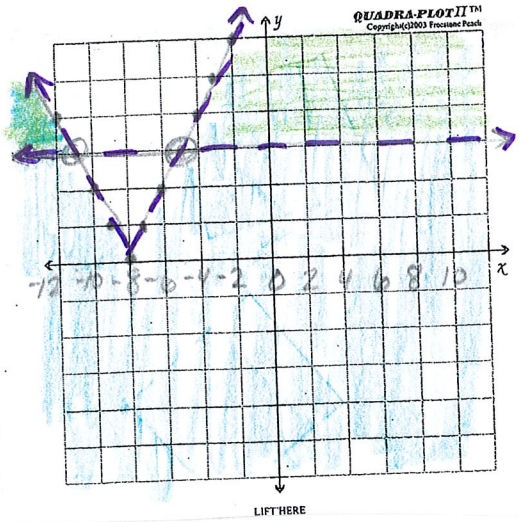
3. $|x + 8| > 3$

$|x+8|>y$

$3<y$

- graph the left side as $y < |x + 8|$
- graph the right side as $y > 3$
- Sketch a graph of the function in the space to the right
- Find the intersection of the two lines and write the solution below:

$x < -11$ OR $x < -5$



Conjunction

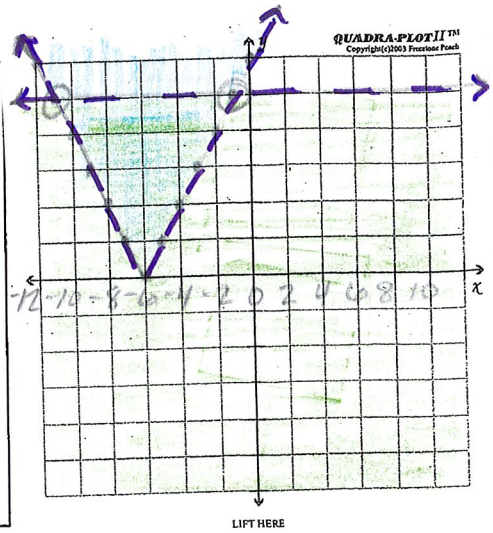
4. $|x + 6| < 5$

$|x+6|<y$

$5>y$

- graph the left side as $y > |x + 6|$
- graph the right side as $y < 5$
- Sketch a graph of the function in the space to the right
- Find the intersection of the two lines and write the solution below:

$-11 < x < -1$



- How are the graphs of conjunctions and disjunctions similar? How are they different?

DIFFERENT – CONJUNCTION SHADE BELOW horizontal line
DISJUNCTION SHADE ABOVE horizontal line

SAME – SHAPES

- How are the solutions of conjunctions and disjunctions different?

CONJECTION SOLUTIONS INCLUDE EVERYTHING BETWEEN THE INTERSECTION POINTS

DISJUNCTION SOLUTION HAS TWO separate sets of SOLUTIONS

- How can you tell when an inequality will be a conjunction and when it will be a disjunction?

CONJUNCTION – when absolute value is alone on left it WILL BE Less than

DISJUNCTION – GREATER THAN

Can I Graph You, Too?

Introduction to Disjunction and Conjunction Homework

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Solve the following absolute value inequalities graphically.

Problem 1

$|3x| + 1 \geq 5$

$-1 \quad -1$

$|3x| \geq 6$

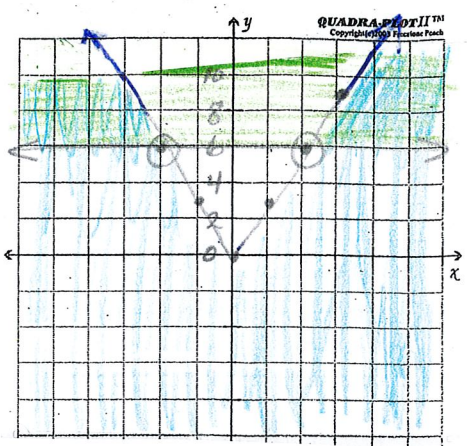
* Isolate Absolute Value first

Answer: $x \leq -2$ or $x \geq 2$

Circle one: Conjunction **Disjunction**

$|3x| \geq y$

$6 \leq y$



Problem 2

$2|x - 4| \leq 8$

$\div 2 \quad \div 2$

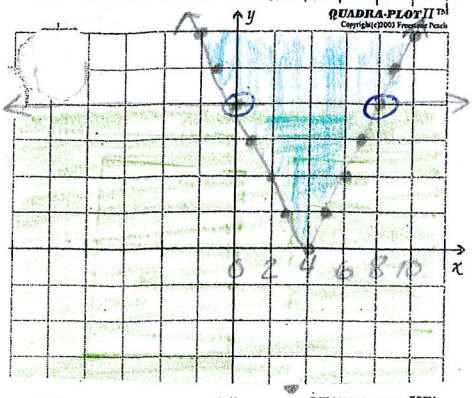
$|x - 4| \leq 4$

Answer: $0 \leq x \leq 8$

Circle one: **Conjunction** Disjunction

$|x-4| \leq y$

$4 \geq y$



Problem 3

$\frac{1}{3}|x - 4| \geq 2$ ·3 ·3

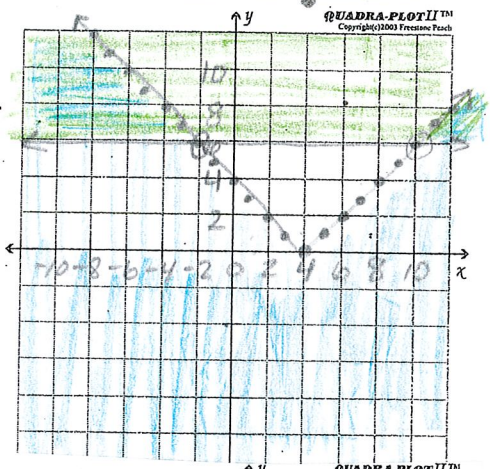
$|x - 4| \geq 6$

Answer: $x \leq -2$ or $x \geq 10$

Circle one: Conjunction **Disjunction**

$|x-4| \geq y$

$6 \leq y$



Problem 4*

$-2|4x - 7| + 6 > -18$

$-6 \quad -6$

$\frac{-2|4x-7|}{-2} > \frac{-24}{-2}$

$|4x - 7| < 12$

Answer: $-1.25 < x < 4.75$

Circle one: **Conjunction** Disjunction

$|4x-7| < y$

$12 > y$

L

$4x - 7 > -12$

$+7 \quad +7$

$\frac{4x}{4} > \frac{-5}{4}$

$x > -1\frac{1}{4}$

R

$4x - 7 < 12$

$+7 \quad +7$

$\frac{4x}{4} < \frac{19}{4}$

$x < 4\frac{3}{4}$

X	$4x-7$	Y
-4	$\lvert 4(-4)-7\rvert = \lvert -16-7\rvert = \lvert -23\rvert$	23
-3	$\lvert 4(-3)-7\rvert = \lvert -12-7\rvert = \lvert -19\rvert$	19
-2	$\lvert 4(-2)-7\rvert = \lvert -8-7\rvert = \lvert -15\rvert$	15
-1	$\lvert 4(-1)-7\rvert = \lvert -4-7\rvert = \lvert -11\rvert$	11
0	$\lvert 4(0)-7\rvert = \lvert 0-7\rvert = \lvert -7\rvert$	7
1	$\lvert 4(1)-7\rvert = \lvert 4-7\rvert = \lvert -3\rvert$	3
2	$\lvert 4(2)-7\rvert = \lvert 8-7\rvert = \lvert 1\rvert$	1
3	$\lvert 4(3)-7\rvert = \lvert 12-7\rvert = \lvert 5\rvert$	5
4	$\lvert 4(4)-7\rvert = \lvert 16-7\rvert = \lvert 9\rvert$	9
5	$\lvert 4(5)-7\rvert = \lvert 20-7\rvert = \lvert 13\rvert$	13
6	$\lvert 4(6)-7\rvert = \lvert 24-7\rvert = \lvert 17\rvert$	17