Alg 1 Honors

Name KEY ID: 1

Midterm Review 2019-20 (PART 2)

Date _____ Period ____

Solve each equation.

1) $-4 - |2x - 4| = -18$

$+4 \quad +4$

$-|2x-4| = -14$

$-1 \quad -1$

$|2x-4| = 14$

$-$ ↙ ↘ $+$

$2x - 4 = -14$ | $2x - 4 = +14$

$+4 \quad +4$ | $+4 \quad +4$

$\frac{2x}{2} = \frac{-10}{2}$ | $\frac{2x}{2} = \frac{18}{2}$

$x = -5$ | $x = 9$

Remember: to check solutions!

2) $6 - 3|x - 4| = 24$

$-6 \quad -6$

$-3|x-4| = 18$

$-3 \quad -3$

$|x-4| = -6$

$x =$ NO SOLUTION

SOLVE each compound inequality. Circle the solution. Then GRAPH its solution.

3) $-4 + n \geq -4$ or $2n + 10 \leq 10$

$+4 \quad +4$ | $-10 \quad -10$

$\frac{2n}{2} \leq \frac{6}{2}$

$N \geq 0$ OR $N \leq 3$

GRAPH TO DETERMINE SOLUTIONS

$N =$ ALL REAL #'S

4) $-1 < 9 - 2x \leq 5$

$-9 \quad -9 \quad -9$

SWITCH INEQ'S

$\frac{-10}{-2} < \frac{-2x}{-2} \leq \frac{-4}{-2}$

$5 > x \geq 2$

$2 \leq x < 5$

5) $3x - 10 \geq 4x - 10$ and $-7 - 2x > 10 - 3x$

$-4x \quad -4x$ | $+3x \quad +3x$

$-x - 10 \geq -10$ | $-7 + x > 10$

$+10 \quad +10$ | $+7 \quad +7$

$\frac{-x}{-1} \geq \frac{0}{-1}$

$x \leq 0$ AND $x > 17$

$x =$ NO SOLUTION

Solve each inequality and graph its solution.

6) $-8|8k-5|-6 \geq -110$

$+6 \quad +6$

$-8|8k-5| \geq -104$

$\div -8 \quad \div -8$

$|8k-5| \leq 13$

$\Downarrow$

$-13 \leq 8k-5 \leq 13$

$+5 \quad +5 \quad +5$

$-8 \leq 8k \leq 18$

$\div 8 \quad \div 8 \quad \div 8$

$-1 \leq x \leq 9/4$ (also $1\ 3/4$ or 1.75)

7) $5-3|6-5x| \geq 92$

$-5 \quad -5$

$-3|6-5x| \geq 87$

$\div -3 \quad \div -3$

$|6-5x| \leq -29$

x = NO SOLUTION

8) $-3|8m+10|+5 \leq -85$

$-5 \quad -5$

$-3|8m+10| \leq -90$

$\div -3 \quad \div -3$

$|8m+10| \geq 30$

$8m+10 \leq -30$ OR $8m+10 \geq 30$

$-10 \quad -10 \qquad -10 \quad -10$

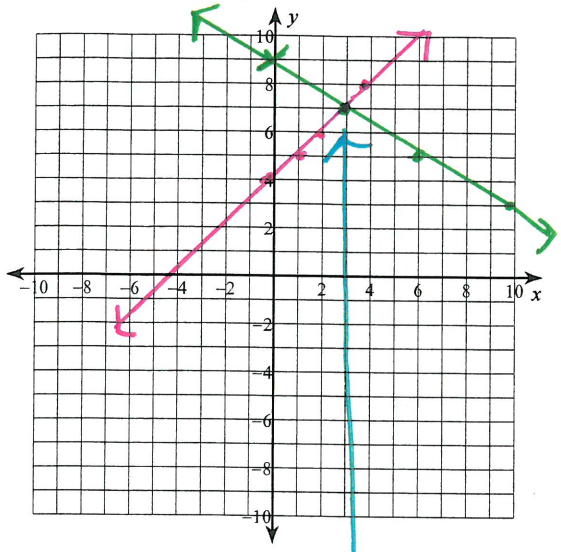
$8m \leq -40 \qquad 8m \geq 20$

$\div 8 \quad \div 8 \qquad \div 8 \quad \div 8$

$m \leq -5$ OR $m \geq 5/2$ (or $2\ 1/2$, 2.5)

Solve the system by graphing; Then check the solution algebraically

9) $2x + 3y = 27$ (L1)
$x - y = -4$ (L2)



(L1) $2x+3y=27$
$-2x \quad -2x$
$\frac{3y}{3} = \frac{-2x}{3} + \frac{27}{3}$
$y = -\frac{2}{3}x + 9$

C: $2(3)+3(7)=27$
$27=27$ ✓

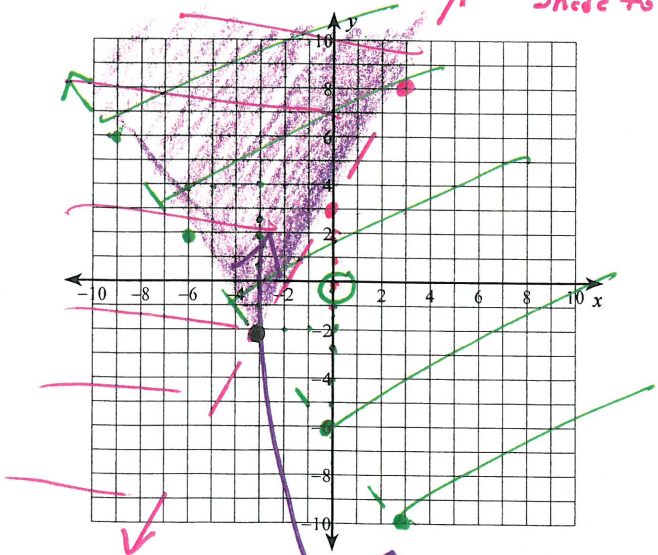
(L2) $x-y=-4$
$-x \quad -x$
$\frac{-y}{-1} = \frac{-x}{-1} - \frac{4}{-1}$
$y = x + 4$

C: $7-(3)=4$
$4=4$ ✓

Solution $(3,7)$
* WRITE AS AN ORDERED PAIR.

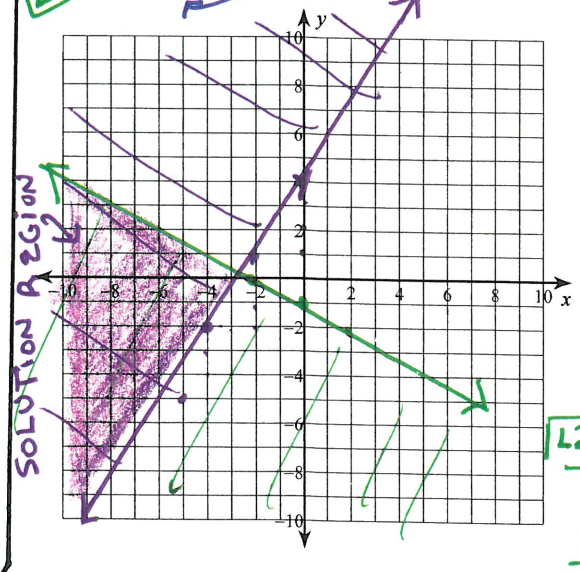
Sketch the solution to each system of inequalities.

10) $y > -\frac{4}{3}x - 6$ [L1] T:(0,0) $0 > -6$ (T) SHADE TOP HALF
$y > \frac{5}{3}x + 3$ [L2] T(0,0) $0 > 3$ (F) Shade top half
Dotted Lines



SOLUTION REGION

11) $3x - 2y \geq -8$ [L1]
$x + 2y \leq -2$ [L2]
SOLID LINES



SOLUTION REGION

[L1] $3x-2y \geq -8$
$-3x \quad -3x$
$\frac{-2y}{-2} \geq \frac{-3x}{-2} - \frac{8}{-2}$ switch
$y \leq \frac{3}{2}x + 4$

T(0,0)
$0 \geq -8$ (T)
shade top

[L2] $x+2y \leq -2$
$-x \quad -x$
$\frac{2y}{2} \leq \frac{-x}{2} - \frac{2}{2}$
$y \leq -\frac{1}{2} - 1$

T(0,0)
$0 \leq -2$ (F)
Shade bottom

Solve each system by elimination. Then check the solution algebraically

12) $8x + 6y = -18$
$13x - 6y = 18$

$21x = 0$
$x = 0$

FIND Y:

$8(0) + 6y = -18$
$6y = -18$
$y = -3$

C: $8(0) + 6(-3) = -18$
$-18 = -18$ ✓

C: $13(0) - 6(-3) = 18$
$18 = 18$ ✓

13) $-5x + 12y = -47$
$-1(-5x + 10y = -45) \rightarrow 5x - 10y = 45$

$2y = -2$
$y = -1$

FIND X:

$-5x + 12(-1) = -47$
$-5x - 12 = -47$
$+12 \quad +12$
$-5x = -35$
$x = 7$

C: $-5(7) + 12(-1) = -47$
$-47 = -47$ ✓

C: $-5(7) + 10(-1) = -45$
$-45 = -45$ ✓

Solve the system by substitution. Then check the solution algebraically

14) $y = 2x - 30$
$8x - 6y = 200$ substitute

$8x - 6(2x - 30) = 200$
$8x - 12x + 180 = 200$
$-4x + 180 = 200$
$-180 \quad -180$
$-4x = 20$
$x = -5$

FIND Y:

$y = 2(-5) - 30$
$y = -40$

C: $-40 = 2(-5) - 30$
$-40 = -40$ ✓

C: $8(-5) - 6(-40) = 200$
$200 = 200$ ✓

Solve USING ANY METHOD. Then check the solution algebraically

15) $14x - 13y = -180$
$-2x + y = 36$

Substitution

$y = 2x + 36$

$14x - 13(2x+36) = -180$
$14x - 26x - 468 = -180$
$+468 \quad +468$
$-12x = 288$
$\frac{-12x}{-12} = \frac{288}{-12}$
$x = -24$

$y = 2(-24) + 36$
$y = -12$

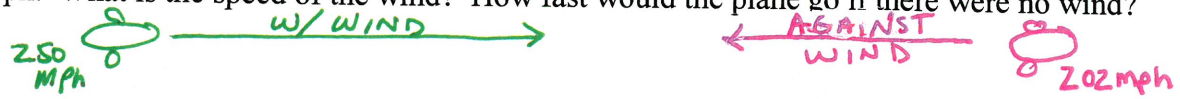
Elimination

$14x - 13y = -180 \rightarrow 14x - 13y = -180$
$7(-2x + y = 36) \rightarrow -14x + 7y = 252$
$-6y = 72$
$\frac{-6y}{-6} = \frac{72}{-6}$
$y = -12$

Find x

$-2x + (-12) = 36$
$+12 \quad +12$
$-2x = 48$
$\frac{-2x}{-2} = \frac{48}{-2}$
$x = -24$

16) Flying with the wind a plane went 250 mph. Flying into the same wind the plane only went 202 mph. What is the speed of the wind? How fast would the plane go if there were no wind?



Define variables: X= SPEED OF PLANE (MPH)
Y= SPEED OF WIND (MPH)

Define system:

EQ1: $x + y = 250$

EQ2: $x - y = 202$

Solve the system:

$\frac{2x}{2} = \frac{452}{2}$

$x = 226$

Find y

$226 + y = 250$
$-226 \quad -226$
$y = 24$

Answer (in words):

The speed of the plane is 226 mph.
(the speed of the wind is 24 mph)

17) The water park is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 3 vans and 14 buses with 651 students. High School B rented and filled 9 vans and 11 buses with 558 students. Every van had the same number of students in it as did the buses. How many students can a van carry? How many students can a bus carry?

Define variables: X= # STUDENTS IN A VAN

Y= # STUDENTS IN A BUS

Define system:

EQ1: SCHOOL A: $[3x + 14y = 651] \cdot -3 \rightarrow -9x - 42y = -1953$

EQ2: SCHOOL B: $9x + 11y = 558 \rightarrow 9x + 11y = 558$

Solve the system:

$-31y = -1398$

$\frac{-31y}{-31} = \frac{-1398}{-31}$

$y = 45$

FIND X: $3x + 14(45) = 651$

$3x + 630 = 651$

$-630 \quad -630$

$\frac{3x}{3} = \frac{21}{3}$

$x = 7$

Answer (in words):

The vans carry 7 students and the buses carry 45 students