Name: Claire Date: 2.27

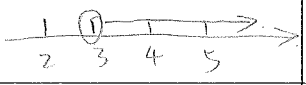
Math 9 Assignment 5.1: Inequalities and Equations

1. Solve each of the inequalities and write your solution on a number line:

a) $3x-1<8$

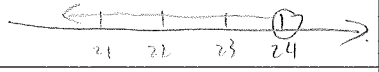
$3x<9$

$x<3$



b) $\frac{3x}{4}>18$

$x>24$



c) $\frac{5x}{2}-4\le 6$

$5x\le 20$

$x\le 4$

d) $\frac{x}{3}+6\ge 1$

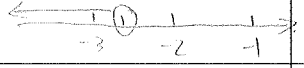
$\frac{x}{3}\ge -5$

$x\ge -15$

e) $6x+5<-11$

$6x<-16$

$x<-\frac{8}{3}$



f) $\frac{4x}{3}-8\le 12$

$\frac{4x}{3}\le 20$

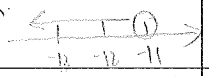
$x\le 15$

g) $3-2(x-4)<-3x$

$3-2x+8<-3x$

$11<-x$

$-11>x$



h) $\frac{2x}{3}-4\le 8$

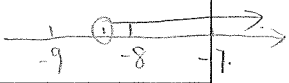
$\frac{x}{3}\le 6$

$x\le 18$

i) $-3x-8<\frac{1}{3}-2x$

$-x<\frac{1}{3}+8$

$x>-8\frac{1}{3}$

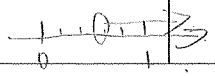


j) $2+\frac{1}{2}(3x-1)<4x$

$4+3x-1<8x$

$3<5x$

$\frac{3}{5}<x$



k) $8-3x+\frac{1}{2}\ge 5-(3x+4)$

$3-3x+\frac{1}{2}\ge -3x-4$

$3\frac{1}{2}\ge -4$

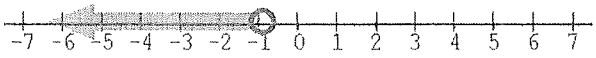
l) $4+3(2-5x)>7-15x$

$4+6-15x>7-15x$

$10>7$

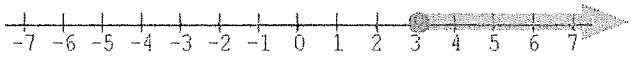
2. Given each of the following number lines, write an expression that satisfies it:

a)



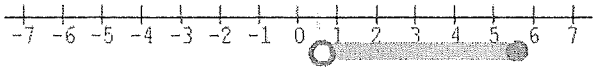
$x<-1$

b)



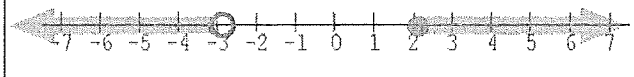
$x\ge 3$

c)



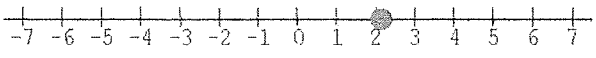
$\frac{1}{2}<x\le 5\frac{1}{2}$

d)



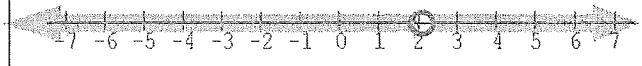
$x<-3$ or $x\ge 2$

e)



$x=2$

f)



$x\neq 2$

3. Write an algebraic expression for each of the following sentences:
   a) The sum of two numbers is less than 12 $x+y<12$
   b) The difference of two numbers is no more than 8 $x-y \leq 8$
   c) One half of a number is not negative $\frac{x}{2} \geq 0$
   d) The sum of the square of three consecutive numbers is alteast 5 $(x-1)^2+x^2+(x+1)^2 \geq 5$
   e) The average of two numbers is atmost 10 $\frac{x+y}{2} \leq 10$
   f) The sum of two perfect squares is positive $x^2+y^2>0$

4. What is the number of integer solutions for: $-5 < \frac{n}{3} < 5$?

   $15-(-15)-1=29$ $-15<n<15$

5. How many integers "n" are there such that: $\frac{2}{101} < \frac{1}{n} < \frac{4}{101}$?

   $26 \leq n \leq 50$ $2n<101<4n$

   $50-26+1=25$

6. What is the smallest positive integer that is a solution of $32x-16>1600$

   $32x>1616$
   $x>\frac{101}{2}$

   51

7. How many integers "n" are there such that $1 \leq n \leq 64$ and n^n is a perfect square?

   $n=2k$ $\frac{64}{2}=32$

8. For how many positive integers "m" does there exist at least one positive integer "n" such that $m \times n \leq m+n$?
   a) 4 b) 6 c) 9 d) 12 e) Infintely Many

   $mxn-m \leq n$
   $m(n-1) \leq n$
   $m \leq \frac{n}{n-1}$

   if $n=1$ $m<mx1$

9. A number "x" is 2 more than the product of its reciprocal and its additive inverse. In which interval does the number lie? (note: the additive inverse of "x" is "-x")
   a) $-4 \leq x \leq -2$ b) $0 \leq x \leq 2$ c) $-2 \leq x \leq 0$ d) $2 \leq x \leq 4$ e) $4 \leq x \leq 6$

   $2+\frac{1}{x}\cdot -x=x$
   $2-1=x$
   $x=1$.

10. Let a, b, and c be numbers with $0 < a < b < c$. Which of the following is impossible?

a) $a+c<b$ b) $a\times b<c$ c) $a+b<c$ d) $a\times c<b$ e) $\frac{b}{c}=a$

11. If $-2\le x\le 5,\ -3\le y\le 7,\ 4\le z\le 8$, and $w=xy-z$, then the smallest value "w" may have is:

a) -14 b) -18 c) -19 d) -22 e) -23

$x=5$
$y=-3$
$z=8$

$w=5\cdot-3-8$
$=-15-8$
$=-23$

12. If $10\le x\le 20$ and $40\le y\le 60$, then what is the largest value of $\frac{x^2}{2y}$?

$x=20$
$y=40$

$\frac{20^2}{2\cdot 40}=\frac{400}{80}=5$

13. How many integer values of "n" satisfy the following inequality?

a) $n^2<36$ b) $n^2-5n<36$

$n=\pm5,-4,-3,-2,-1,0,$
$1,2,3,4,5$

$n^2-5n-36<0$
$(n+4)(n-9)<0$

$-4<n<9$

11

14. How many positive integers "P" will satisfy the inequalities? $-1<\sqrt{p}-\sqrt{100}<1$:

$100<p<121$

$121-100-1=20$

15. How many integer values of "x" satisfy: $\frac{x-1}{3}<\frac{5}{7}<\frac{x+4}{5}$?

a) 0 b) 1 c) 2 d) 3 e) 4

① $35x<110$
$x<\frac{22}{7}$

② $21x>-9$
$x>-\frac{3}{7}$

$35x-35<75<21x+84$

$\begin{cases}35x-35<75 & ①\\ 21x+84>75 & ②\end{cases}$

$x=0,1,2,3$

$\therefore -\frac{3}{7}<x<\frac{22}{7}$

16. Suppose "m" and "n" are positive integers with m< n . Which of the following statement(s) about $\frac{m+3}{n+3}$ will be true? Explain why:

$m+3<n+3$.

a) Equal to 1	TRUE	FALSE
b) Equal to 3	TRUE	FALSE
c) Less than the value of m/n	TRUE	FALSE
d) Greater than the value of m/n	TRUE	FALSE
e) Equal to the value of m/n	TRUE	FALSE

$\frac{1}{2} < \frac{4}{5}$

$\frac{m}{n} < \frac{m+3}{n+3}$

17. Let a,b,c be three different positive integer. What is the number of triple pairs (a,b,c) such that the equation is true? $a+b+c<100$

18. How many positive integers "n" satisfy the following condition: $(130n)^{50} > n^{100} > 2^{200}$? Amc10a 2005

$\begin{cases} (130n)^{50} > n^{100} & ① \\ n^{100} > 2^{200} & ② \end{cases}$

① : $130^{50} n^{50} > n^{100}$

$130^{50} > n^{50}$

$130 > n$.

② $n^{100} > 2^{200}$

$n > 2^2$

$n > 4$

$4 < n < 130$.

$130 - 4 - 1 = 125$

19. Given that $-4 \le x \le -2$ and $2 \le y \le 4$, what is the largest possible value of $\frac{(x+y)}{x}$?

$y = 4$

$x = -4$

$\frac{x+y}{x} = 1 + \frac{4}{-4} = 0$

$= \frac{x}{x} + \frac{y}{x}$

$= \frac{y}{x} + 1$.

20. Given that $-1 \le x \le 1$ and $-1 \le y \le 1$, what is the range of values for "z" if $x+y-xy=z$?

$x = -1$ $\begin{cases} y=-1 \\ y=0 \\ y=1 \end{cases}$ $\begin{matrix} -1 \\ 0 \\ 1 \end{matrix}$

$x = 0$ $\begin{cases} y=-1 \\ y=0 \\ y=1 \end{cases}$ $\begin{matrix} 0 \\ 0 \\ 0 \end{matrix}$

$x = 1$ $\begin{cases} y=-1 \\ y=0 \\ y=1 \end{cases}$ $\begin{matrix} -1 \\ 0 \\ 1 \end{matrix}$

$-1 \le z \le 1$

21. What are all the values of "x" which satisfy $2x-7<3x+3<5-x$?

$\begin{cases} 2x-7 < 3x+3 & ① \\ 3x+3 < 5-x & ② \end{cases}$

① : $-x < 10$

$x > -10$

② : $4x < 2$

$x < \frac{1}{2}$

$-10 < x < \frac{1}{2}$

$x = -9, -8, -7, -6, -5, -4, -3, -2, -1, 0.$

Math 9 Enriched

Assignment 5.1b

Name Claire Li Date 1.25

Solve each of the following and draw the solution on a number line

1. $x + 7 \geq 12$

$x \geq 5$

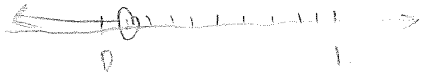
2. $11 + y > 17$

$y > 6$

3. $k + \frac{1}{5} < \frac{3}{10}$

$k < \frac{3}{10} - \frac{2}{10}$

$k < \frac{1}{10}$

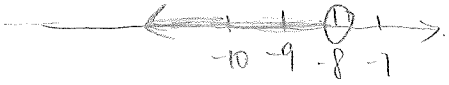


4. $\frac{3}{2} + a < -\frac{5}{2}$

$a < -4$

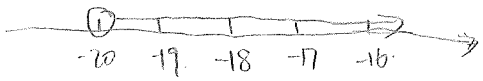
5. $2 > y + 10$

$-8 > y$



6. $7 + p > -13$

$p > -20$



7. $-15 > m - 10$

$-5 > m$

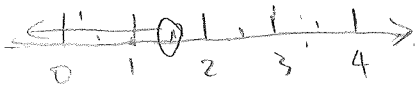
8. $x - 21 \leq -25$

$x \leq -4$

9. $-4 < c - 2\frac{1}{2}$

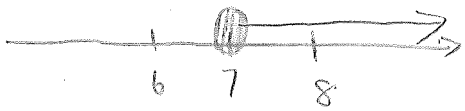
$\frac{5}{2} - 4 < c$

$\frac{3}{2} < c$



10. $3k \geq 21$

$k \geq 7$



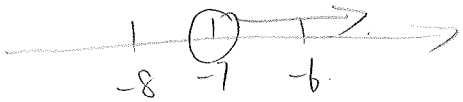
11. $-8 \geq 8x$

$-1 \geq x$

12. $15 < -k + 8$

$7 < -k$

$-7 < k$



13. $-17 \geq -9 - m$

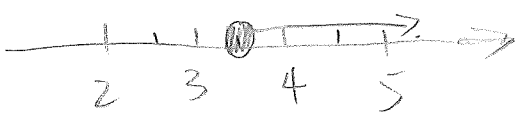
$-8 \geq -m$

$8 \leq m$

14. $4w - 17 \geq 3$

$4w \geq 14$

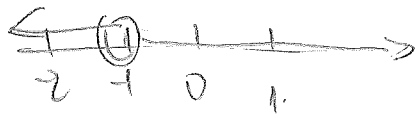
$w \geq \frac{7}{2}$



15. $34 < -8a + 26$

$8 < -8a$

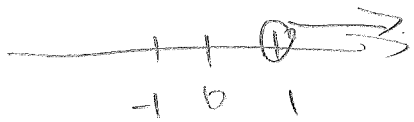
$-1 > a$



16. $1 > -4c + 7 - 2c$

$-6 > -6c$

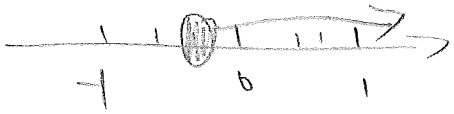
$1 < c$



17. $7 \leq 6m + 8 - 3m$

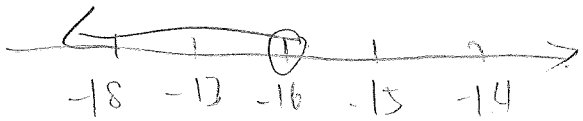
$-1 \leq 3m$

$-\frac{1}{3} \leq m$



18. $2n - 11 > 3n + 5$

$-16 > n$



19. $8r - 6 \leq 10r + 5$

$-11 \leq 2r$

$-\frac{11}{2} \leq r$

20. $7m + 21 - 15m > -4m - 6 - 13m$

$-8m + 17m > -6 - 21$

$9m > -27$

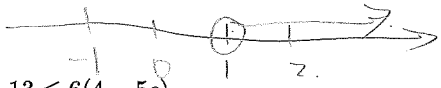
$m > -3$

21. $7(3 - 4n) < 12n - 19$

$21 - 28n < 12n - 19$

$40 < 40n$

$1 < n$



22. $7k - 12 \geq 9(2k - 3)$

$7k - 12 \geq 18k - 27$

$15 \geq 11k$

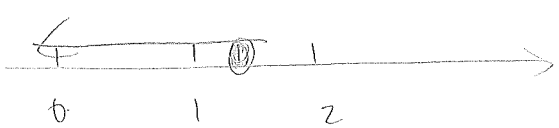
$\frac{15}{11} \geq k$

23. $4s + 13 \leq 6(4 - 5s)$

$4s + 13 \leq 24 - 30s$

$34s \leq 11$

$s \leq \frac{11}{34}$

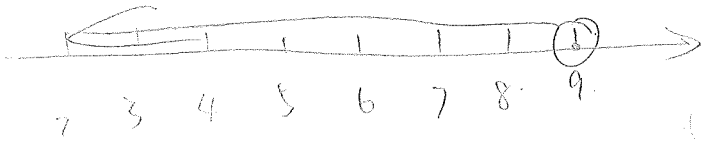


24. $95 < 10(14 - c) + 5c$

$95 < 140 - 10c + 5c$

$-5c < 45$

$c < 9$



25. $1000 < x^5 < 1100$ where x is an integer. Find x.

$x = 4$

$x^5 = 1024$

26. What is the greatest integer x such that $2^x < 10000$

$2^{13} < 10000$

13

27. How many integral values exist for x such that $\frac{1}{4} < \frac{x}{5} < \frac{2}{3}$?

$\frac{5}{4} < x < \frac{10}{3}$ $1x = 2$ or 3.

$\frac{15}{12} < x < \frac{40}{12}$

28. For what whole number n is $10^n < 695\,000 < 10^{n+1}$?

$n = 5$

$100000 < 695000 < 1000000$

29. For how many positive integers n is $2n + 7 < 23$?

$2n < 16$

$n < 8$

0 1 2 3 4 5 6 7 8

$n = 1, 2, 3, 4, 5, 6, 7$

7

30. What is the greatest integer value for m such that $5m - 3 > 8m + 21$?

$24 > 3m$

$-8 > m$

$m = -9$ max.

-9 -8 -7

31. Joe and Millie each have some baseball cards, and $\frac{3}{4}$ of the number of cards Joe has is equal to $\frac{2}{3}$ of the number of cards Millie has. What is the least number of cards they could have altogether?

j = the # of cards Joe has.

m = the # of cards Millie has.

$\frac{3}{4}j = \frac{2}{3}m$

$9j = 8m$

min $\rightarrow \begin{cases} j = 8 \\ m = 9 \end{cases}$

$8 + 9 =$ 17 cards

32. Coach Kooch is ordering ribbons for awards. He needs 20 ribbons. The ribbons cost 30¢ each when 20 or fewer are ordered. For orders of 21 or more, the cost is reduced to 27¢ each. What is the largest number of ribbons that the coach can buy and still spend less than the cost of 20 ribbons?

x = largest # of ribbons the coach can buy

$27x < 20 \times 30$

$27x < 600$

$x < \frac{200}{9}$

$x_{max} = 22$

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Math 9 Enriched Assignment 5.1b Mr. Young 02/27/13

Answer List

1.
2. $y > 6$
3. $k < \frac{1}{10}$
4. $a < -4$
5. $y < -8$
6. $p > -20$
7. $m < -5$
8. $x \leq -4$
9. $c > -\frac{3}{2}$
10. $k \geq 7$
11. $x \leq -1$
12. $k < -7$
13. $m \geq 8$
14. $w \geq 5$
15. $a < -1$
16. $c > 1$
17. $m \geq -\frac{1}{3}$
18. $n < -16$
19. $r \geq -\frac{11}{2}$
20. $m > -3$
21. $n > 1$
22. $k \leq \frac{15}{11}$
23. $s \leq \frac{11}{34}$
24. $c < 9$
25. 4
26. 13
27. 2 (values)
28. 5
29. 7 (integers)
30. -9
31. 17 (cards)
32. 22 (ribbons)

Catalog List

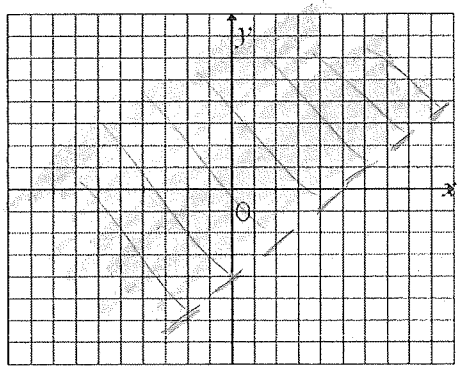
1.
2. ALG OA 2
3. ALG OA 4
4. ALG OA 9
5. ALG OA 7
6. ALG OA 12
7. ALG OA 25
8. ALG OA 26
9. ALG OA 28
10. ALG OA 37
11. ALG OA 55
12. ALG OA 91
13. ALG OA 100
14. ALG OA 112
15. ALG OA 156
16. ALG OB 4
17. ALG OB 6
18. ALG OB 21
19. ALG OB 23
20. ALG OB 40
21. ALG OB 46
22. ALG OB 47
23. ALG OB 48
24. ALG OB 52
25. MCC BD 2
26. MCC BD 12
27. MCC BD 58
28. MCC BD 82
29. MCC BD 74
30. MCC BD 71
31. MCC BD 66
32. MCC BD 55

Name: Claire Li Date: 3.3

Math 9 Enriched: Section 5.2 Graphing Inequalities on XY Plane

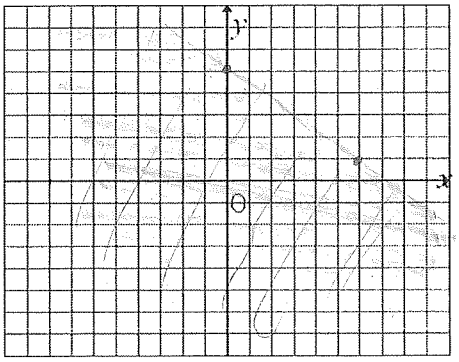
1. Graph each of the following inequalities and shade in the correct area:

i) $4x-5y<20$

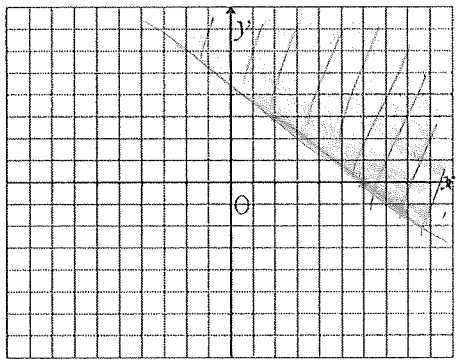


x int: (0,5)
y int: (-4,0)

ii) $2x+3y\leq 15$

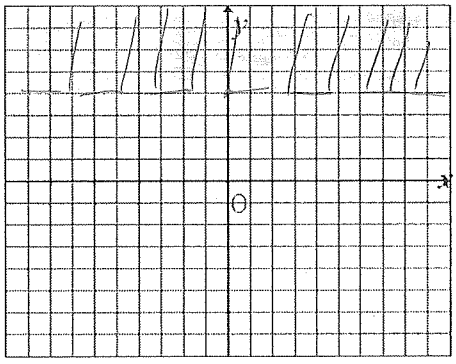


iii) $3x+4y\geq 18$

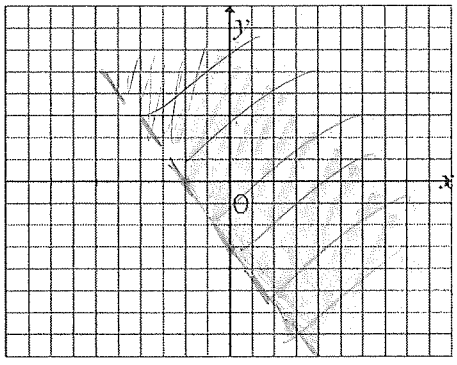


iv) $3y-12>0$

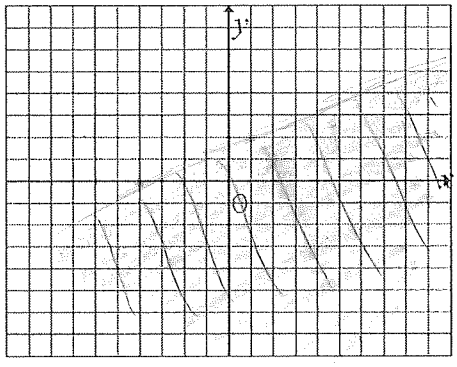
$3y>12$
$y>4$



v) $3x+2y>-6$

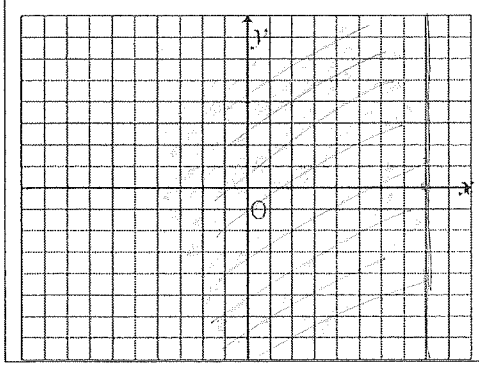


vi) $-2x-3y\geq -8$

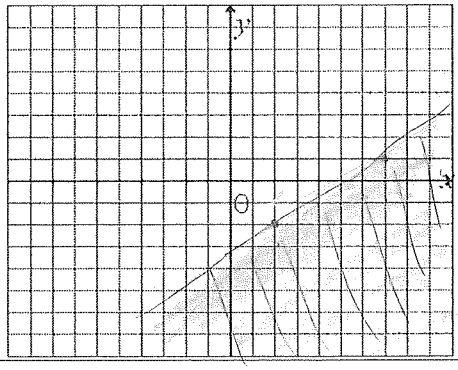


vii) $-\frac{7}{4}x\geq 14$

$-x\geq 8$
$x\leq 8$



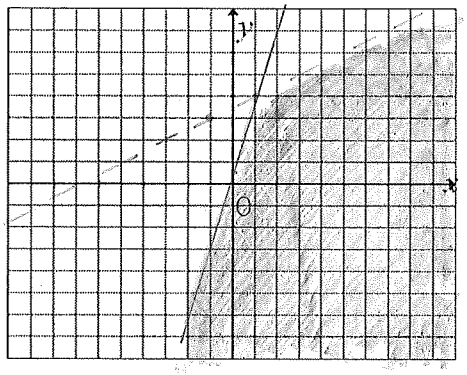
viii) $-3x+5y\leq -16$



2. Graph the system with the given two inequalities:

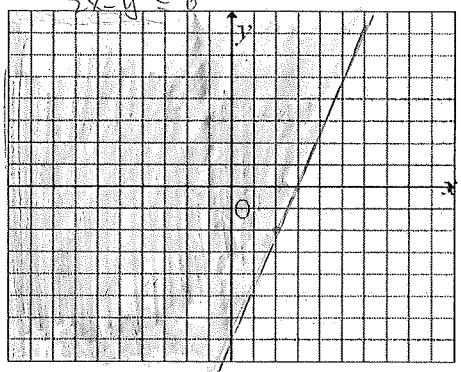
i) $7x-2y\geq -1$ (1,4) $(0,\frac{1}{2})$.

$x-2y>-7$ (-1,3) (-3,2)



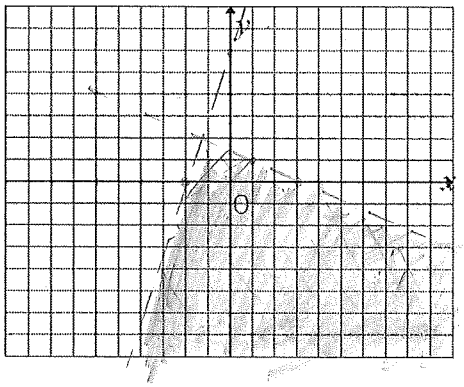
ii) $2x-y<6$ (3,0) (2,-2)

$-2x+y\geq -6$ $2x-y\leq 6$



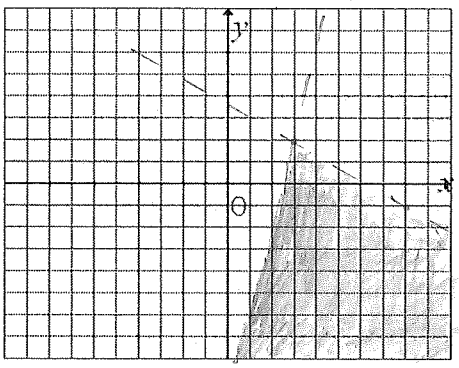
iii) $x+2y<3$ (1,1) (3,0)

$3x-y>-6$ (-2,0) (0,6)



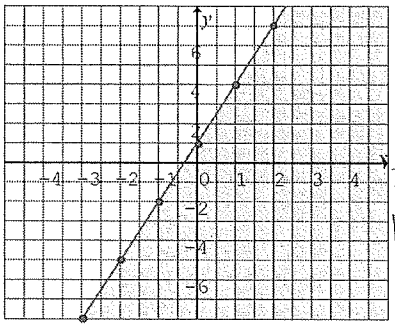
iv) $4x-y-10>0$ $4x-y>10$ (3,2) (1,-6)

$3x+5y<19$ (3,2). (8,-1)



3. Given each of the following graphs, write the inequalities that corresponds with the shaded region:

a)



(0,1) (-1,-2)

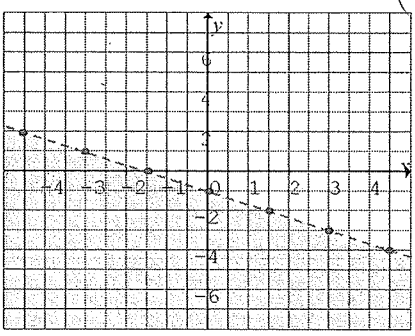
$m=\frac{-2-1}{-1-0}=3$

$y=3x+1$

$3x-y=-1$

$3x-y\geq -1$

b)



(-2,0) (0,-1)

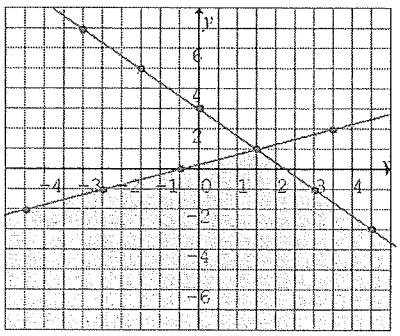
$m=\frac{-1-0}{0-(-2)}=\frac{-1}{2}=-\frac{1}{2}$

$y=-\frac{1}{2}x-1$

$y+\frac{1}{2}x=-1$

$y+\frac{1}{2}x\leq -1$

c)



(0,3) (3,-1)

$y=-\frac{4}{3}x+3$.

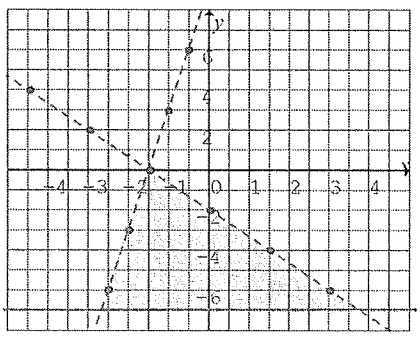
$y+\frac{4}{3}x<3$

(-3,1) $(-\frac{1}{2},0)$.

$y=-\frac{2}{5}x-\frac{1}{5}$.

$y+\frac{2}{5}x>-\frac{1}{5}$

d)



(-2,0), (0,-2)

$y=-x-2$

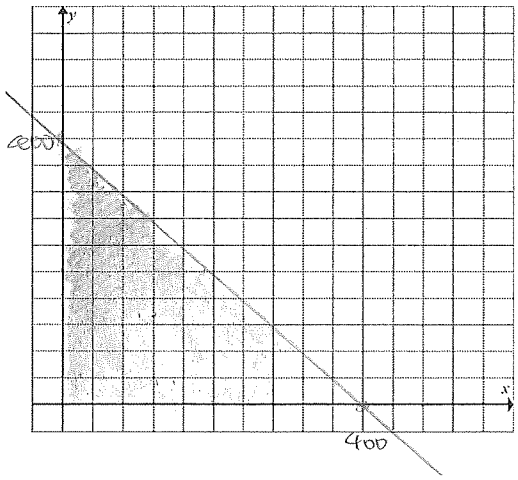
$y+x<-2$

(-2,0) (-3,-6)

$y=6x+12$

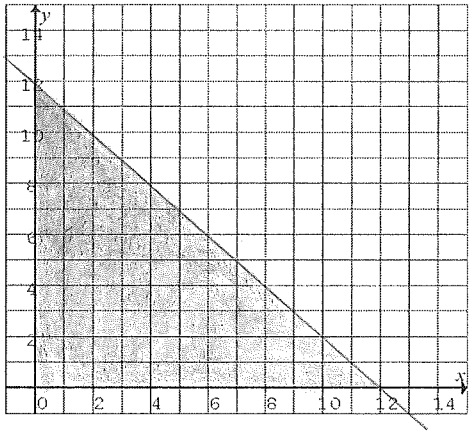
$y-6x<12$

4. A company makes motorcycles and bicycles. In any given week, a total of up to 400 vehicles can be made. Draw a graph showing the number of motorcycles and bicycles that could be made in one week.



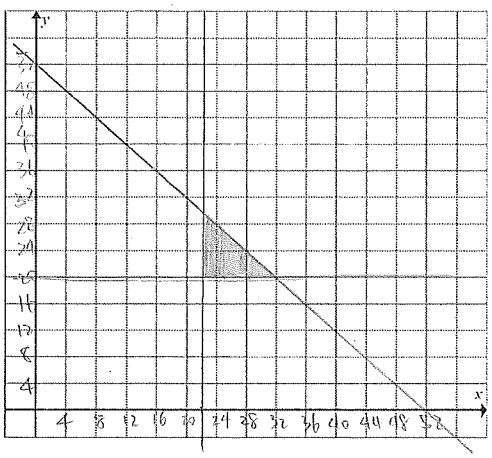
$$\begin{cases} m+b \le 400 \\ m \ge 0 \\ b \ge 0 \end{cases}$$

5. Jack plans to spend up to 12 hours reviewing Science and Mathematics in preparation for examinations. Draw a graph showing how much time he could spend studying for each subject.



$$\begin{cases} s+m \le 12 \\ s \ge 0 \\ m \ge 0 \end{cases}$$

6. Use the following information to draw a graph showing the ages at which men and women in China can marry:



x = age for men
y = age for women

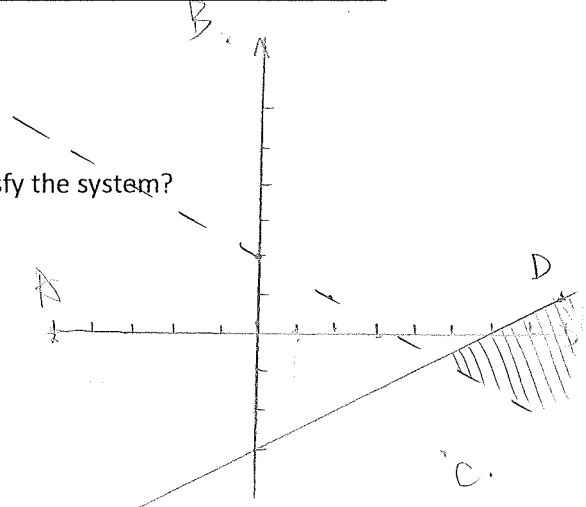
$$\begin{cases} x+y \le 52 \\ x \ge 22 \\ y \ge 20 \end{cases}$$

A Chines e law sets minimal legal ages for marrying. The minimum legal age is 22 for men and 20 for women. In addition, couples are urged not to marry until the ages of the bride and groom total more than 52.

7. Given the system of inequalities, how many of the given points satisfy the system?

$x+2y>4$
$x-2y \ge 6$

$A(-5,0)$ $B(-1,7)$ $C(5,-3)$ $D(8,1)$



8. Which of the following shapes best describes the solution to the area of the system:

$x+2y\le 6 \quad x+2y\ge -4$

$x-2y\ge -4 \quad x-2y<6$

A)Parallelogram B)Square C)Rhombus D)Rectangle

9. Which of the following inequalities have the same graph?

$A)\ y<\frac{1}{2}x-3 \quad B)\ \frac{1}{2}x-y>3 \quad C)\ \frac{1}{2}x+y<-3 \quad D)\ \frac{1}{2}x-y<3$

$y-\frac{1}{2}x<-3 \quad y-\frac{1}{2}x<-3 \quad y+\frac{1}{2}x<-3$

10. Find the area of the triangle defined by the give system:

$3x-4y-4<0, \quad x+4y+12<0, \quad x>-4$

$3x-4y<4 \quad x+4y<-12$

$\frac{30-26}{2}=\boxed{2}$

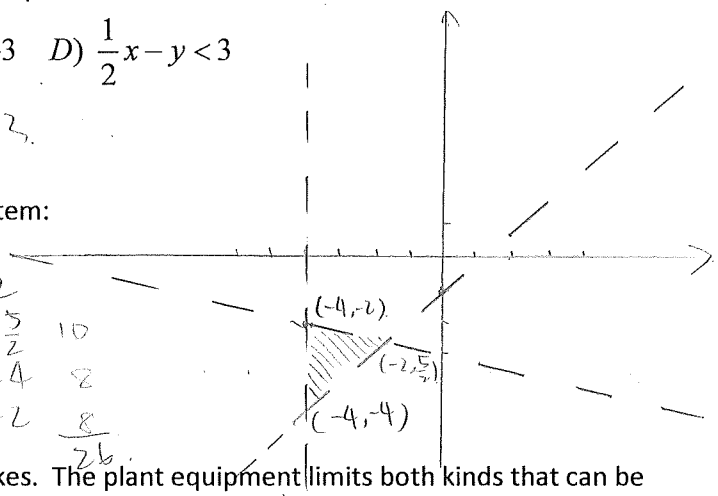
$-4,-2$

$4\ -2\ \times\ \frac{5}{2}\ 10$

$10\ -4\ \times\ 4\ 8$

$16\ -4\ \times\ 2\ 8$

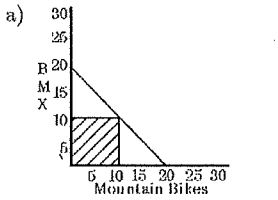
$30 \quad 26$

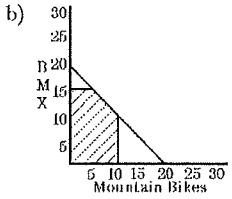


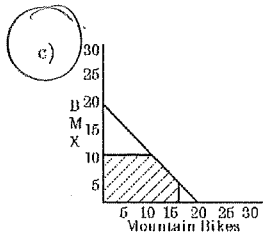
11. A Bike company makes BMX bikes and mountain bikes. The plant equipment limits both kinds that can be made in one day. The limits are as follows:

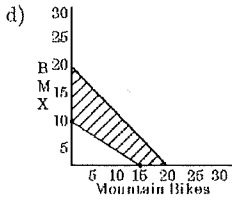
1) No more than 10 BMX bikes 2) No more than 15 mountain bikes 3) No more than 20 in total

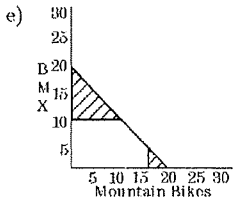
Choose the graph that shows the number of bikes of each that can be made in one day:









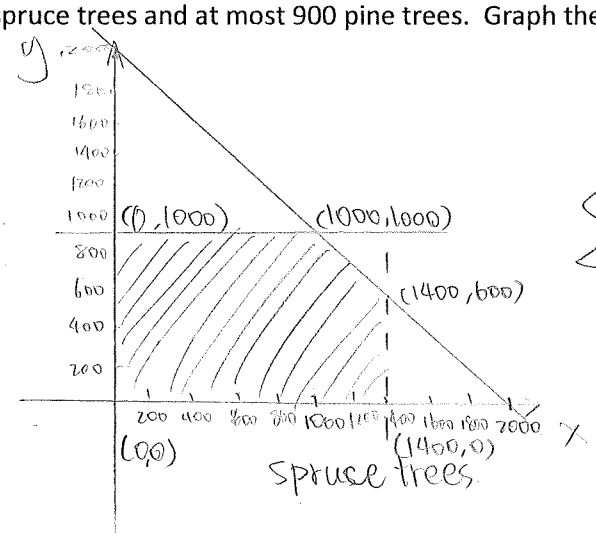


x – mountain bikes

y – BMX bikes

$\begin{cases} x\le 15 \\ y\le 10 \\ x+y\le 20 \end{cases}$

12. Jason is a tree planter. He can only plant up to 2000 trees in a season. However, he must plant less than 1400 spruce trees and at most 900 pine trees. Graph the solution. Find the area of the shape of the solution.



x – spruce trees.

y – pine trees.

$\begin{cases} x<1400 \\ y\le 900 \\ x+y\le 2000 \end{cases}$

$1000\ 0 \quad 1000\ 0$

$1400000\ 1400 \quad 600\ 600000$

$840000\ 1400 \quad 0\ 0$

$0 \quad 0 \quad 0 \quad 0$

3240000

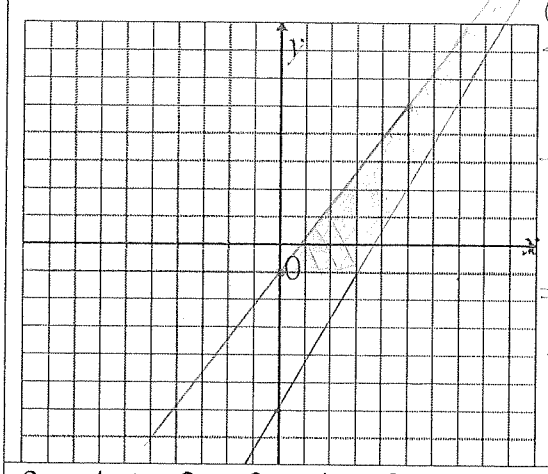
$\frac{3240000-600000}{2}=\frac{2640000}{2}=1320000$

Name: Claire Li Date: 3.6. 10/10

Math 9 Enriched: Section 5.3 Graphing Systems of Linear Inequalities

1. Given each of the systems, graph it and find the area enclosed

a) $5 \le 6x-5y$, $18 \ge 5x-3y$, $y \ge -1$



$\begin{cases} 6x-5y=5 \\ 5x-3y=18 \end{cases}$

$\begin{cases} x=\frac{75}{7} \\ y=\frac{83}{7} \end{cases}$

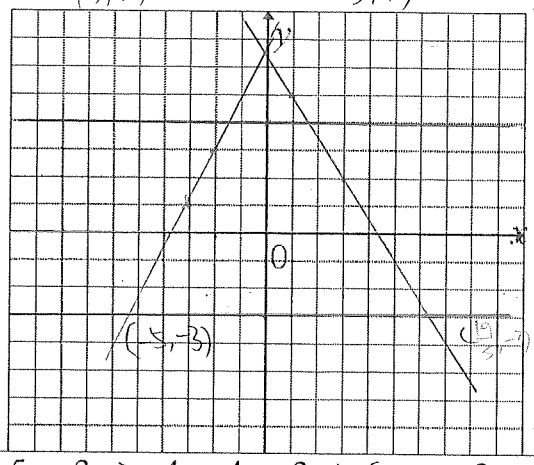
A shaded $= \frac{b \cdot h}{2}$

$= \frac{3 \cdot (\frac{83}{7}+1)}{2}$

$= \boxed{\frac{135}{2}}$

b) $3x+2y \le 13$, $-2x+y \le 7$, $y \le 4$, $y \ge -3$

(1,5) (-2,3) (3,2) (-3,1)



$\begin{cases} 3x+2y=13 \\ -2x+y=7 \end{cases}$

$\begin{cases} x=-\frac{1}{7} \\ y=\frac{47}{7} \end{cases}$

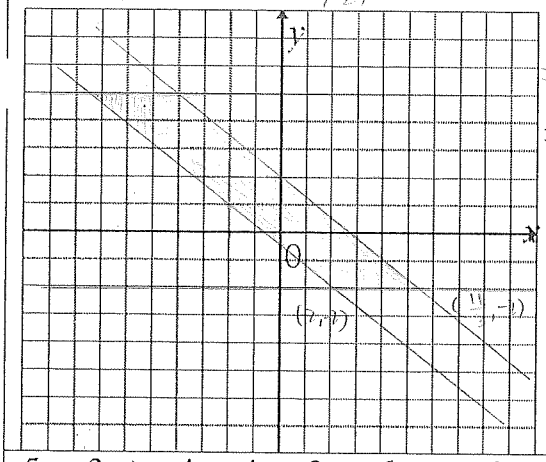
A shaded $= \frac{b \cdot h}{2}$

$= \frac{(\frac{47}{7}+3)(5+\frac{19}{3})}{2}$

$= \boxed{\frac{1156}{21}}$

$3x+4y \ge -2$, $3x+4y \le 8$, $y \le 5$, $y \ge -2$

$(0,-\frac{1}{2})$ $(0,2)$ $(-2,1)$ $(2,\frac{1}{2})$



A shaded $= b \cdot h$

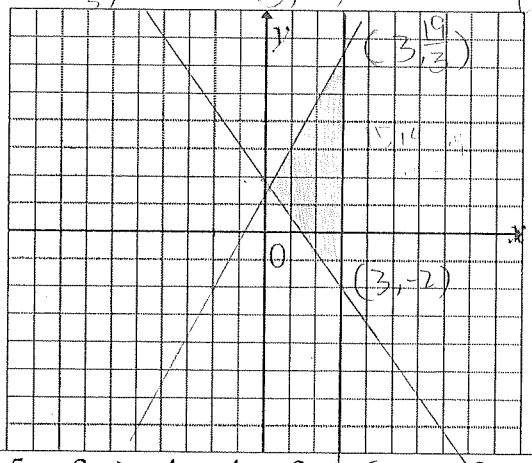
$= (\frac{16}{3}-2)(5+2)$

$= \frac{10}{3} \cdot 7$

$= \boxed{\frac{70}{3}}$

$5x-3y \ge -4$, $4x+3y \ge 6$, $x \le 3$

$(-2,-2)$ $(0,2)$ $(0,\frac{4}{3})$ $(3,-2)$



$\begin{cases} 5x-3y=-4 \\ 4x+3y=6 \end{cases}$

$9x=2$

$x=\frac{2}{9}$ $y=\frac{46}{27}$

A shaded $= b \cdot h$

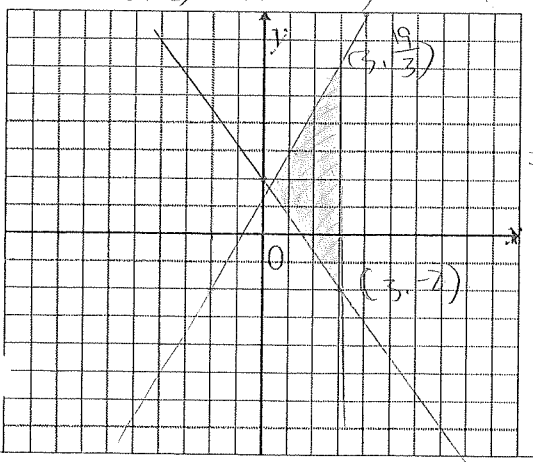
$= (\frac{19}{3}+2) \cdot (3-\frac{2}{9})$

$= \frac{25}{3} \cdot \frac{25}{9}$

$= \boxed{\frac{625}{27}}$

$5x-3y \ge -4$, $4x+3y \ge 6$, $x \le 3$

$(-2,-2)$ $(0,2)$ $(3,-2)$ $(0,2)$

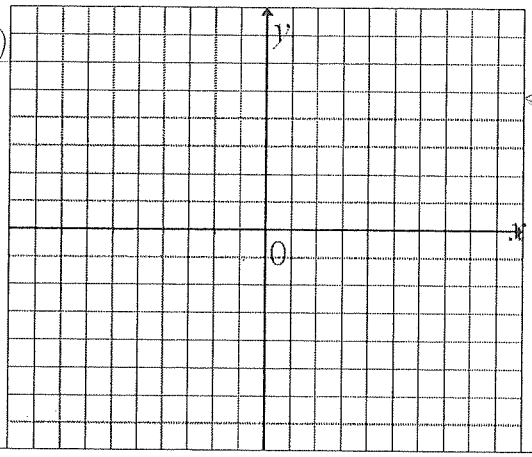


$(\frac{19}{3}+2) \cdot (3-\frac{2}{9})$

$\frac{25}{3} \cdot \frac{25}{9}$

$= \frac{625}{54}$

$5x-3y \ge -4$, $4x+3y \ge 6$, $x \le 3$



same question.

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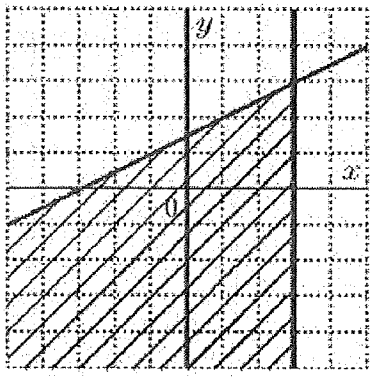
2. Find the values of "A", "B", and the inequality sign in the system so that it will correspond with the solution given:

$x - Ay \boxed{\geq} -3$, $x \leq B$



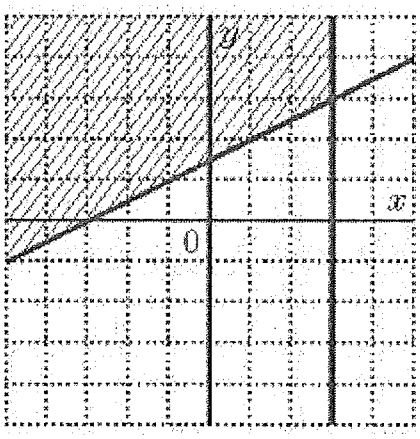
$B=3$.

$(3,3)$ & $(-3,0)$.

$3-3A \boxed{\geq} -3$.

$\begin{cases} A=2. \\ B=3. \end{cases}$ //

$x - Ay \boxed{\leq} -3$, $x \leq B$



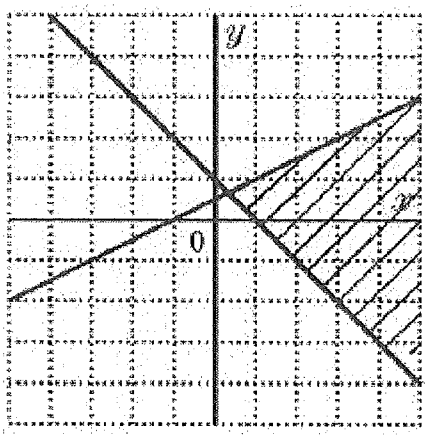
$B=3$.

$(3,3)$ & $(-3,0)$

$3-3A \boxed{\leq} -3$.

$\begin{cases} A=2. \\ B=3. \end{cases}$ //

$x - Ay \boxed{\geq} -1$, $x + By \boxed{\geq} C$



$(0,1)$ & $(1,0)$

$\therefore B=C=1$.

$(-1,0)$, $(1,1)$

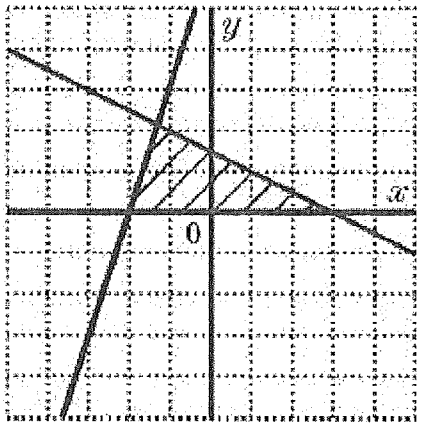
$1-A=-1$

$-A=-2$.

$A=2$.

$\begin{cases} A=2. \\ B=1 \\ C=1 \end{cases}$ //

$x + Ay \boxed{\leq} 3$, $Bx - y \boxed{\geq} -6$, $y \boxed{\geq} D$ $D=0$.



$(3,0)$ $(-1,2)$

$-1+2A=3$

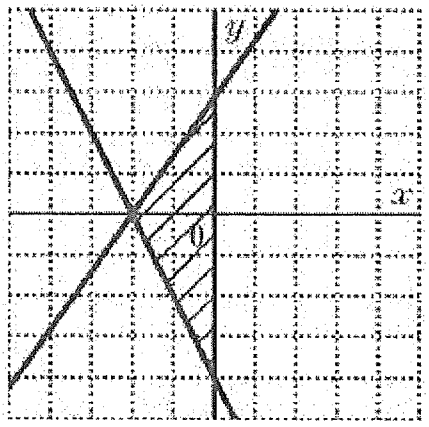
$A=2$.

$(-2,0)$ $(-1,3)$

$B=3$.

$\begin{cases} A=2 \\ B=3 \end{cases}$ //

$Fx - Ay \boxed{\geq} -6$, $Bx + y \boxed{\geq} -4$, $x \boxed{\leq} D$



$D=0$.

$(-2,0)$ $(0,3)$.

$-2F=-6$ $-3A=-6$

$F=3$. $A=2$

$(-2,0)$ $(0,-4)$.

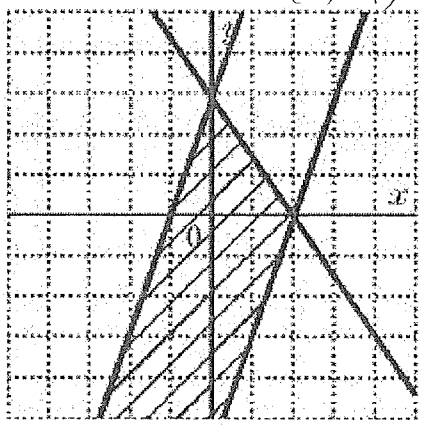
$-2B=4$

$B=2$.

$\begin{cases} A=2. \\ B=2. \\ D=0. \\ F=3 \end{cases}$ //

$Fx - Ay \boxed{\ } -6$, $Bx + y \boxed{\ } -4$, $Cx + Dy \boxed{\ } 6$

$(0,-4)$?



$(0,3)$ $(2,0)$.

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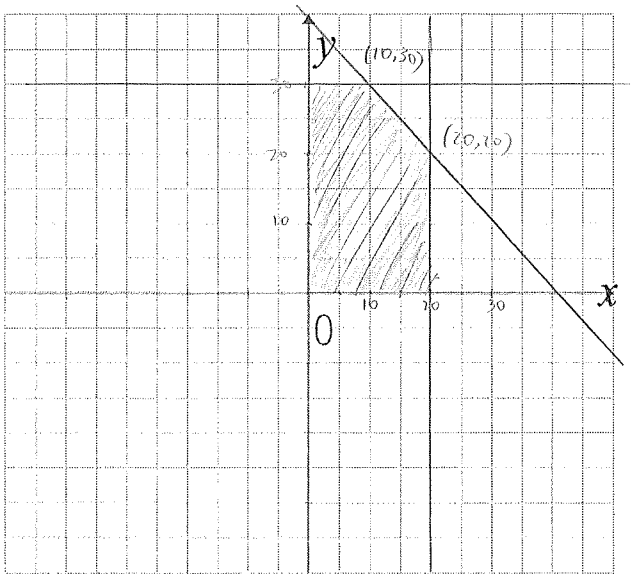
3. A company makes cell phone and laptops. The physical dimensions of the work area limit the number of both kinds that can be made in one day. $0 \le p \le 20$ $0 \le l \le 30$

No more than 20 phones can be made
No more than 30 laptops can be made
No more than 40 items can be made

$0 \le p + l \le 40$



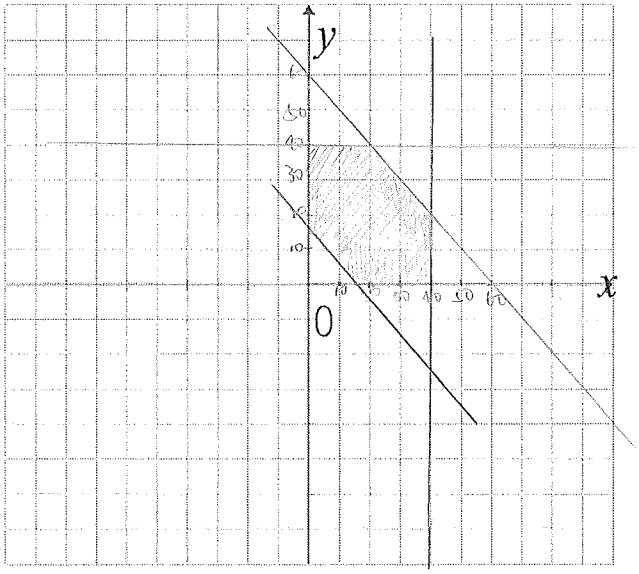
Draw a graph of the system to illustrate the number of cell phones and laptops that can be made and find the area of the shaded solution.

$30 \times 20 - \frac{10 \times 10}{2}$

$= 600 - 50$

$= 550$

4. Max is a realtor and also a taxi driver and he works up to 60 hours a week. He spends up to 40 hours a week managing his business as a realtor. As a taxi driver, he works no more than 40 hours a week. To maintain his financial income, Max must work atleast 15hours altogether. $0 \le R \le 40$ $15 \le R + T \le 60$ $0 \le T \le 40$



a) Graph the system that describes the number of hours Max works for each job

b) Label all the equations in your graph

$$\begin{cases} 0 \le x \le 40 \\ 0 \le y \le 40 \\ x + y \ge 15 \\ x + y \le 60 \end{cases}$$

5. Jason is a tree planter. He can only plant up to 2000 trees in a season. However, he must plant less than 1400 spruce trees and at most 900 pine trees. Graph the solution. Find the area of the shape of the solution.

$0 \le s \le 1400$

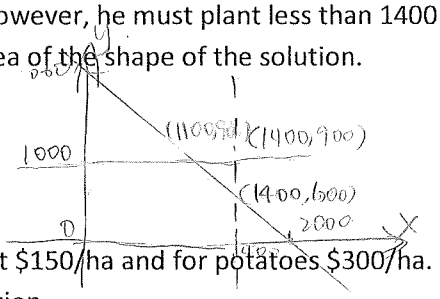
$0 \le p \le 900$

$0 \le s + p \le 2000$

$900 \times 1400 - \frac{300^2}{2}$

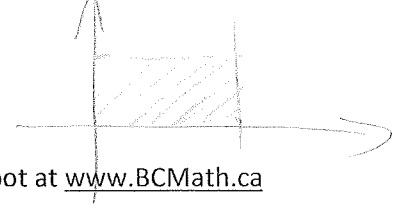
$= 1260000 - 45000$

$= 1215000$



6. A 60Ha farmland is planted with corn and potatoes. Planting for corn cost \$150/ha and for potatoes \$300/ha. If only \$10000 can be spent for planting, draw a graph to illustrate the solution.

$150x + 300y \le 10000$



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$$x - 2y \geq -3 \quad x - 2y \geq -3 \quad x - 2y \geq -1$$
$$x + 0y \leq 3 \quad x + 0y \leq 3 \quad x + y \geq 1$$

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$$x + 2y \leq 3 \qquad 3x - 2y \geq -6 \qquad 3x - y \geq -3$$
$$3x - y \geq -6 \qquad 2x + y \geq -4 \qquad 3x - y \leq 6$$
$$y \geq 0 \qquad x \leq 0 \qquad 3x + 2y \leq 6$$

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Name: Claire Date: March 10

Math 9 Enriched: Section 5.4 Solving Systems with Three Variables

1. Solve each of the system:

1a $\begin{cases} 2x-5y+2z=29 \\ 4x+3y+z=13 \\ 3x+6y+3z=3 \end{cases}$ $x+2y+z=1$

$6x-15y+6z=87$ ①
$24x+18y+6z=78$ ②
$6x+12y+6z=6$ ③

② − ①: $18x+33y=-9$.
② − ③: $18x+6y=72$.
$27y=-81$
$y=-3$.
$5+(-6)+2z=1$
$z=2$ ∴ $x=5$.

$\begin{cases} x=5 \\ y=-3 \\ z=2 \end{cases}$

1b $-2x+2y+4z=8$ ①
$x+4y+3z=11$ ②
$3x+2y=7$ ③.

① − ③: $-5x+4z=1$
② − 2①: $x+4x+3z-8z=-5$
$5x-5z=-5$
$x-z=-1$
$4x-4z=-4$.

$-x=3$
$x=3$.
$3-z=4$.
$y=-1$.

$\begin{cases} x=3 \\ y=-1 \\ z=4 \end{cases}$

1c $2x+3y+2z=-4$
$x+y+4z=3$
$4x-5y+6z=6$

$4x+6y+4z=-8$ ①
$4x+4y+16z=12$ ②
$4x-5y+6z=6$ ③

② − ①: $-2y+8z=20$
$-y+4z=10$
$-4y+36z=90$
② − ③: $9y+10z=6$
$46z=96$
$23z=48$
$z=\frac{48}{23}$.
$y=-\frac{38}{23}$.
$x+\frac{38}{23}+\frac{192}{23}=3$
$23x-154=69$
$23x=223$.
$x=\frac{223}{23}$.

$\begin{cases} x=\frac{223}{23} \\ y=-\frac{38}{23} \\ z=\frac{48}{23} \end{cases}$

1d $3x+y-2z=13$ ①
$2x+5y+2z=6$ ②
$2x+y+2z=11$ ③
① + ②: $5x+6y=19$
③ − ②: $-4y=5$
$y=-\frac{5}{4}$.
$x=\frac{53}{10}$

$2x+y+2z=11$
$\frac{53}{5}+\frac{5}{4}+2z=11$.
$212-25+40z=220$
$z=\frac{33}{40}$

$\begin{cases} x=\frac{53}{10} \\ y=-\frac{5}{4} \\ z=\frac{33}{40} \end{cases}$

1e $\begin{cases} 6x-4y-3z=6 \\ 3x+2y=8+5z \\ 2x+3y=11+3z \end{cases}$ ①
$6x+4y-10z=16$ ②
$6x+9y-9z=33$ ③

① − ②: $-8y+7z=-10$
③ − ②: $5y+z=17$.
$35y+7z=119$
$43y=129$
$y=3$.
$z=2$.

$2x+9=11+6$
$2x=8$
$x=4$.

$\begin{cases} x=4 \\ y=3 \\ z=2 \end{cases}$

1f $2x+2z=18+2y$
$2z=3x+3y$
$5x=10+4y+6z$

$2x+3x+3y=18+2y$.
$5x+y=18$.
$65x+13y=234$
$5x=10+4y+9x+9y$
$4x+3y=-10$

$61x=244$
$x=4$
$y=-2$
$2z=3(4-2)$
$z=3$.

$\begin{cases} x=4 \\ y=-2 \\ z=3 \end{cases}$

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2. Word problems:

a) The sum of twice the first number, four times the second, and triple the third equals 6. The sum of all three numbers times two is 1.5. The sum of four times the first, four times the second, and five times the third is 6. Find all three numbers

$\begin{cases} 2x+4y+3z=6 \\ 4x+4y+4z=3 \\ 4x+4y+5z=6 \end{cases}$ $2x+z=-3$ $z=3$ $x=-3$ $-3+3+4y=1.5$ $y=0.75$ $\begin{cases} x=-3 \\ y=0.75 \\ z=3 \end{cases}$

b) The sum of triple the second and four times the third number is equal to the one plus triple the first number. The sum of the first number and triple the second is equal to 12. The sum of twice the first number, the second number, and five is equal to twice the third. Find the numbers.

$\begin{cases} 3y+4z=1+3x \\ x+3y=12 \\ 2x+y+5=2z \end{cases}$ $\rightarrow 3x-3y-4z=-1$, $4x+2y-4z=-10$ $-x-5y=9$ $x+3y=12$ $-2y=21$ $y=-\frac{21}{2}$ $x=12+\frac{63}{2}=\frac{87}{2}$ $87-\frac{21}{2}+5=2z$ $\frac{163}{4}=z$ $\begin{cases} x=\frac{87}{2} \\ y=-\frac{21}{2} \\ z=\frac{163}{4} \end{cases}$

c) The sum of the first number and twice the second is equal to 12 minus four times the third. The sum of triple the first number and four times the second is equal to five minus the third number. Five times the first number is equal to 4 minus six times the second number. Find the numbers.

$\begin{cases} x+2y=12-4z \\ 3x+4y=5-z \\ 5x=4-6y \end{cases}$ $x+2y+4z=12$, $12x+16y+4z=20$ $\rightarrow$ $33x+42y=24$ $11x+14y=8$ $25x+42y=28$ $5x+6y=4$ $2x=4$ $x=2$ $y=-1$ $2-2=12-4z$ $z=3$ $\begin{cases} x=2 \\ y=-1 \\ z=3 \end{cases}$

3. The daily profit of a clothing kiosk is determined by the equation $p=ax^3+bx^2+cx$, where "p" is the profit, and "x" is the cost of each t-shirt. If the t-shirt cost \$10, the profit is \$800. If the cost is \$16, the profit is \$992. If the cost is \$20, the profit is \$600. Find a,b,and c.

$\begin{cases} 1000a+100b+10c=800 \\ 4096a+256b+16c=992 \\ 8000a+400b+20c=600 \end{cases}$ $\begin{cases} 100a+10b+c=80 \ ① \\ 256a+16b+c=62 \ ② \\ 400a+20b+c=30 \ ③ \end{cases}$ ②-①: $156a+6b=-18$ ③-②: $144a+4b=-32$ $312a+12b=-36$ $432a+12b=-96$ $120a=-60$ $\begin{cases} a=-0.5 \\ b=11.5 \\ c=-3 \end{cases}$

4. Determine the number of triples (k, l, m) of positive integers such that:

$k+l+m=97$

$\frac{4k}{5}+\frac{5l}{6}+\frac{6m}{7}=82$ Let $k=5K$, $l=6L$, $m=7M$

$\begin{cases} 4K+5L+6M=82 \ ① \\ 5K+6L+7M=97 \ ② \\ K+L+M=15 \ ③ \end{cases}$ ①-5③: $-k+M=7$ $\begin{cases} M=7+K \\ 2K+L=8 \end{cases}$ $\begin{cases} K=1 \ 2 \ 3 \\ L=6;4;2 \\ M=8 \ 9 \ 10 \end{cases}$

$\therefore \begin{cases} k=5 \\ l=36 \\ m=56 \end{cases}$ or $\begin{cases} k=10 \\ l=24 \\ m=63 \end{cases}$ or $\begin{cases} k=15 \\ l=12 \\ m=70 \end{cases}$

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5. Challenge: What are all ordered triples of numbers (x,y,z) which satisfy the system of equations:

$$(x+y)(z+1)=24$$
$$(x+z)(y+1)=24$$
$$(y+z)(x+1)=24$$

$x=y=z$

$(x+x)(x+1)=24$

$2x^2+2x=24$

$x^2+x-12=0$

$(x+4)(x-3)=0$

$x=3$ or -4.

(3, 3, 3) or (−4, −4, −4)

$$(x+y)(x+y+z)=120$$
$$(y+z)(y+z+x)=96$$
$$(x+z)(x+y+z)=72$$

Let $\frac{x+y}{120}=\frac{y+z}{96}=\frac{x+z}{72}=a$

$$\begin{cases} x+y=120a & ① \\ y+z=96a & ② \\ x+z=72a & ③ \end{cases}$$

$\frac{①+②+③}{2}$: $x+y+z=144a$

$$\begin{cases} x=48a \\ y=72a \\ z=24a \end{cases}$$

$a=\pm\frac{1}{12}$

(4, 6, 2) or (−4, −6, −2)

6. One ordered triple (x,y,z) which satisfies the system is (0,0,0). What is the only numerical value of "k" for which this system has a solution other than (0,0,0)

$$x-2y+kz=0$$
$$2x-y+3z=0$$
$$3x-3y-2z=0$$

$\begin{cases} 9y+(9-6k)z=0 \\ 9y+39z=0 \end{cases}$

$(9-6k)z-39z=0$

$9-6k=39$

$k=-5$

$$\begin{cases} 6x-12y+6kz=0 \\ 6x-3y+9z=0 \\ 6x-6y-4z=0 \end{cases}$$

7. Determine all real values of "p" and "r" that satisfy the following system of equations:

$$p+pr+pr^2=26$$
$$p^2r+p^2r^2+p^2r^3=156$$

$pr(p+pr+pr^2)=156$

$pr\cdot 26=156$

$pr=6$

$\begin{cases} p=2 \\ r=3 \end{cases}$ $\begin{cases} p=18 \\ r=\frac{1}{3} \end{cases}$

$p+6+6r=26$

$p+6r=20$

8. Four positive integers a, b, c, and d have a product of "8!" and satisfy the system. What is the value of $a-d$?

$$ab+a+b=524$$
$$bc+b+c=146$$
$$cd+c+d=104$$

$ab+a+b=524 \rightarrow a(b+1)+(b+1)=525$

$$\begin{cases} (a+1)(b+1)=525 & ① \\ (b+1)(c+1)=147 & ② \\ (c+1)(d+1)=105 & ③ \end{cases}$$

$\frac{①③}{②}=\frac{(a+1)(b+1)(c+1)(d+1)}{(b+1)(c+1)}=\frac{525\times 105}{147}$

$(a+1)(d+1)=375$

$375=3\cdot 5^3$

$$\begin{cases} a=24 \\ b=20 \\ c=6 \\ d=14 \end{cases}$$

$a\cdot b\cdot c\cdot d=40320$

$=8!$ ✓

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9. For what value(s) of "k" does the linear system of equations

a) have no solutions? B) have precisely one solution?

$$kx + y + z = k$$
$$x + ky + z = k$$
$$x + y + kz = k$$

10. Let a,b,c be non-zero constants. Solve the system for (x,y,z) in terms of a,b,c:

$$\begin{cases} ay + bx = c & ① \\ az + cx = b & ② \\ bz + cy = a & ③ \end{cases}$$

$\Rightarrow$ $acy + bcx = c^2$
$abz + bcx = b^2$

$$\begin{cases} abz - acy = b^2 - c^2 \\ abz + acy = a^2 \end{cases}$$

$2abz = a^2 + b^2 - c^2$

$z = \dfrac{a^2 + b^2 - c^2}{2ab}$

$2acy = a^2 - b^2 + c^2$

$y = \dfrac{a^2 + c^2 - b^2}{2ac}$

$\therefore x = \dfrac{b^2 + c^2 - a^2}{2bc}$

$$\begin{cases} x = \dfrac{b^2 + c^2 - a^2}{2bc} \\ y = \dfrac{a^2 + c^2 - b^2}{2ac} \\ z = \dfrac{a^2 + b^2 - c^2}{2ab} \end{cases}$$

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Math 9 Enriched

Assign 5..5

Name Claire Li Date March 12

1. Solve the inequality $x^2 \leq 0$

$x = 0$

2. Solve the inequality $15 - 2y - y^2 \leq 0$

$y^2 + 2y - 15 \geq 0$

$(y+5)(y-3) \geq 0$

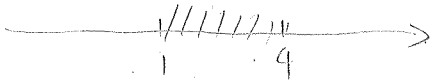
$y \leq -5$ or $y \geq 3$

3. Solve the inequality $-4 + 5y - y^2 > 0$

$y^2 - 5y + 4 < 0$

$(y-4)(y-1) < 0$

$1 < y < 4$

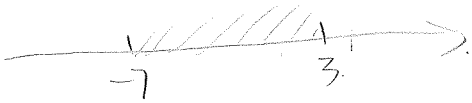


4. Solve the inequality $21 - 4y - y^2 \geq 0$

$y^2 + 4y - 21 \leq 0$

$(y+7)(y-3) \leq 0$

$-7 \leq y \leq 3$



5. Solve the inequality $24 + 5y - y^2 < 0$

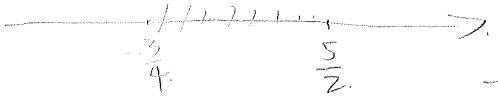
$y^2 - 5y - 24 > 0$

$(y-8)(y+3) > 0$

$y < -3$ or $y > 8$;

6. Solve the inequality $8x^2 + 14x - 15 < 0$

$(4x+13)(2x-5) < 0$



$-\frac{3}{4} < x < \frac{5}{2}$

7. Solve the inequality $6x^2 - 13x - 5 > 0$

$(2x-5)(3x+1) > 0$

$x < -\frac{1}{3}$ $x > \frac{5}{2}$

8. Solve the inequality $20x - 4x^2 - 25 \geq 0$

$4x^2 - 20x + 25 \leq 0$

$(2x-5)^2 \leq 0$

$x = \frac{5}{2}$

9. Solve the inequality $25x^2 + 10x + 1 > 0$

$(5x+1)^2 > 0$

$x \neq -\frac{1}{5}$

10. Solve the inequality $-12x + 4x^2 + 9 < 0$

$4x^2 - 12x + 9 < 0$

$(2x-3)^2 < 0$

No solution

Solve.

11. $8 + h < 3h - [7 - (2 - h)]$

$8 < 2h - (7 - 2 + h)$

$8 < 2h - 7 + 2 - h$

$13 < h$

12. $c(c + 3) < c^2 + 4c + 6$

$c^2 + 3c < c^2 + 4c + 6$

$-6 < c$

13. $a^2 + 11a - 15 \geq a(a - 3) + 2$

$a^2 + 11a - 15 \geq a^2 - 3a + 2$

$14a \geq 17$

$a \geq \frac{17}{14}$

14. $4h(3h + 5) - 2 \leq 6h(2h + 3) + 1$

$12h^2 + 20h - 2 \leq 12h^2 + 18h + 1$

$2h \leq 3$

$h \leq \frac{3}{2}$

15. $5w(4w - 3) + 21 \geq 2w(10w + 1) - 13$

$20w^2 - 15w + 21 \geq 20w^2 + 2w - 13$

$34 \geq 17w$

$2 \geq w$

16. $3y(3y + 5) - 20 > 9y(y + 2) + 4$

$9y^2 + 15y - 20 > 9y^2 + 18y + 4$

$-24 > 3y$

$-8 > y$

17. For how many positive integer values of x is $x^{-1} > x$?

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

$1 > x^2$

No solution.

18. Find the smallest whole number value of x that satisfies this inequality.

$$5x - \frac{1}{3} > \frac{1}{5} + 3x$$

$15x - 5 > 3 + 45x$

$30x > 8$

$x > \frac{4}{15}$

$x_{min} = 1$

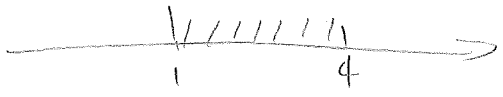
19. For what value(s) of r, a real number, is the following statement true?
$3 - 2r(1 - r) > 6r - (2 - (7r + 2r^2))$

$3 - 2r + 2r^2 > 6r - 2 + 7r + 2r^2$

$5 > 15r$

$\frac{1}{3} > r$

20. How many positive integers satisfy the inequality $(x - 1)(x - 4) < 0$?



$1 < x < 4$

21. What is the greatest integer x such that $2^x < 10000$

$8192 < 10000$

$2^{13} < 10000$

$x = 13$.

22. Find the smallest (positive) integer n for which:

$$\frac{1}{1^2} + \frac{1}{2^2} + \cdots + \frac{1}{n^2} > \frac{3}{2}$$

$\frac{1}{1} + \frac{1}{4} + \frac{1}{9} + \frac{1}{16} + \frac{1}{25} + \frac{1}{36} + \frac{1}{49} > \frac{3}{2}$.

$n = 7$.

23. What is the sum of all integer values of x such that $\frac{31}{90} < \frac{x}{100} < \frac{41}{110}$ is true?

$\frac{31}{9} < \frac{x}{10} < \frac{41}{11}$

$\frac{310}{9} < x < \frac{410}{11}$

$x = 35, 36, 37$.

sum of values:

108

24. For what integer value of n is $10^n < 0.00125 < 10^{n+1}$?

$n = -5$

25. What is the greatest integer x such that $x^3 \leq 2000$?

$x = 12$.

$x^3 = 1728$

26. If $y = -|x - 2|$, for what value of x will y attain its maximum value?

$y = 0$.

$x = 2$.

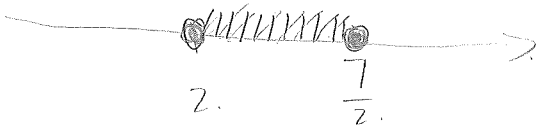
27. How many integers are common to the solution sets of both inequalities?

$x + 7 \geq 3x$ → $7 \geq 2x$

$3x + 4 \leq 5x$ → $\frac{7}{2} \geq x$

$4 \leq 2x$

$2 \leq x$



$x = 2, 3$.

2 integers.

28. How many integers are common to the solution sets of both inequalities?

$|x| + 4 \leq 6$

$x + 2 \geq 1$

$|x| \leq 2$.

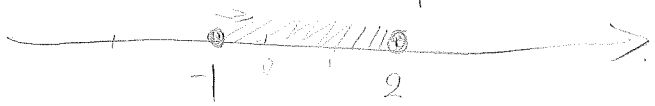
$x \geq -1$

$x \leq 2$. $-x \leq 2$.

or $x \geq -2$.

$\begin{cases} x \geq -1 \\ x \leq 2 \end{cases}$ or $\begin{cases} x \geq -1 \\ x \geq -2 \end{cases}$.

$-1 \leq x \leq 2$ or $x \geq -1$



$-1 \leq x \leq 2$.

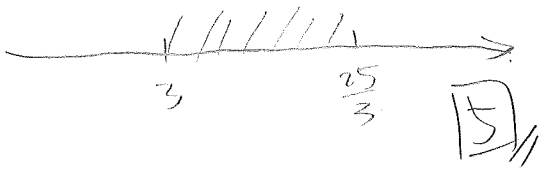
4 integers

29. How many integers are common to the solution sets of both inequalities?

$3x < 25$ $\quad x < \frac{25}{3}$.

$x > 3$ $\quad x > 3$.

$x = 4, 5, 6, 7, 8$.

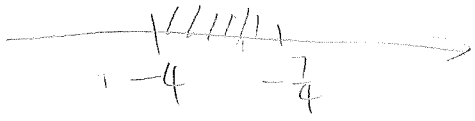


5

30. How many integers are common to the solution sets of both inequalities?

$-3x \geq x + 7$ $\quad x \leq -\frac{7}{4}$.

$-2x \leq 8$ $\quad x \geq -4$



$x = -4, -3, -2$

31. How many integers are common to the solution sets of the two inequalities shown below?

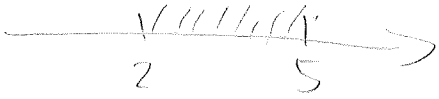
$6x - 10 < x + 15$ $\quad 5x < 25$

$3x - 2 > 2 + x$ $\quad x < 5$

$2x > 4$

$x > 2$. $\quad x = 3, 4$

2



32. How many integers are common solutions to these three inequalities?

1) $-3y \geq y + 7$

2) $-2y \leq 12$

3) $-4y \geq 2y + 17$

$-4y \geq 7$ $\quad y \geq -6$

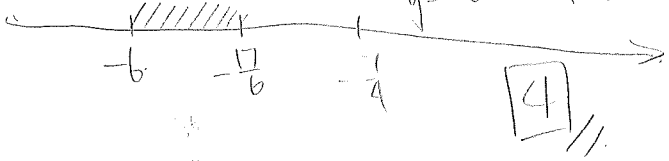
$y \leq -\frac{7}{4}$

$-6y \geq 17$

$y \leq -\frac{17}{6}$

$-6 \leq y \leq -\frac{17}{6}$

$y = -6, -5, -4, -3$



4

33. For what positive integer a is

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \cdots + \frac{1}{a} < 2 < \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \cdots + \frac{1}{a} + \frac{1}{a+1}?$$

$\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+\frac{1}{8}+\frac{1}{9}+\frac{1}{10} < 2$.

$\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+\frac{1}{8}+\frac{1}{9}+\frac{1}{10}+\frac{1}{11}$.

$a = 10$

34. A baseball player goes to bat at the 6th inning. Before he went to bat, his hitting percentage is 0.224. After he hits a homerun, his hitting percentage is now at 0.228. How many hits has he taken the entire season? This is a very tricky question.

$$\begin{cases} \frac{x}{y} = 0.224 \\ \frac{x+1}{y+1} = 0.228 \end{cases}$$

$x = 0.224y$

$x = 0.228y + 0.228 - 1$.

$1 - 0.228 = 0.004y$

$193 = y$

$y = 43.232$

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Math 9 Enriched Assign 5..5 Mr. Young 2/10/2012

Answer List

1. $y \leq -5$ or $y \geq 3$
2. $y \leq -5$ or $y \geq 3$
3. $y > 1$
4. $-7 \leq y \leq 3$
5. $y < -3$ or $y > 8$
6. $-\frac{5}{2} < x < \frac{3}{4}$
7. $x < -\frac{1}{3}$ or $x > \frac{5}{2}$
8. $x = \frac{5}{2}$
9. all x except $-\frac{1}{5}$
10. no values of x
11. $h > 13$
12. $c > -6$
13. $a \geq \frac{17}{14}$
14. $h \leq \frac{3}{2}$
15. $w \leq 2$
16. $y < -8$
17. none
18. 1
19. $r < \frac{1}{3}$
20. 2 (integers)
21. 13
22. 7
23. 108
24. -3
25. 12
26. 2
27. 2
28. 4
29. 5
30. 3
31. 2
32. 4
33. 10
34. 215*hitsaltogether*

Catalog List

1.
2. AW2 DE 17
3. AW2 DE 18
4. AW2 DE 19
5. AW2 DE 20
6. AW2 DE 21
7. AW2 DE 22
8. AW2 DE 25
9. AW2 DE 27
10. AW2 DE 28
11. ALG OB 65
12. ALG OB 94
13. ALG OB 95
14. ALG OB 98
15. ALG OB 99
16. ALG OB 100
17. MCC BD 29
18. MCC BD 17
19. MCC BD 15
20. MCC BD 11
21. MCC BD 12
22. MCC BD 33
23. MCC BD 76
24. MCC BD 77
25. MCC BD 89
26. MCC BE 89
27. MCH BD 6
28. MCH BD 7
29. MCH BD 8
30. MCH BD 9
31. MCH BD 14
32. MCH BD 44
33. MCH BD 60
34.