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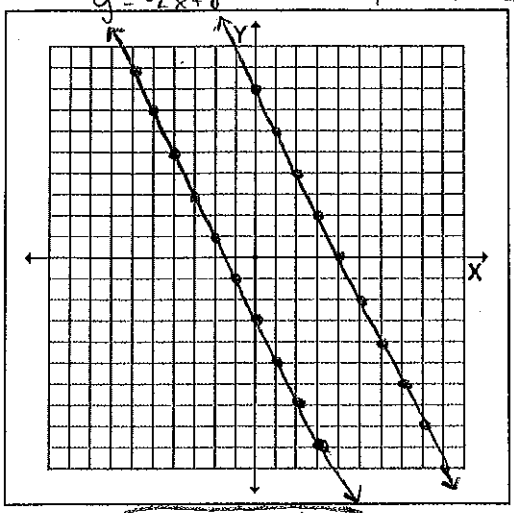
Practice Test Unit 1: Solving Systems

Solve each system of equations by graphing.

1. $4x + 2y = -6$
   $2x + y = 8$

$y = -2x - 3$

$y = -2x + 8$



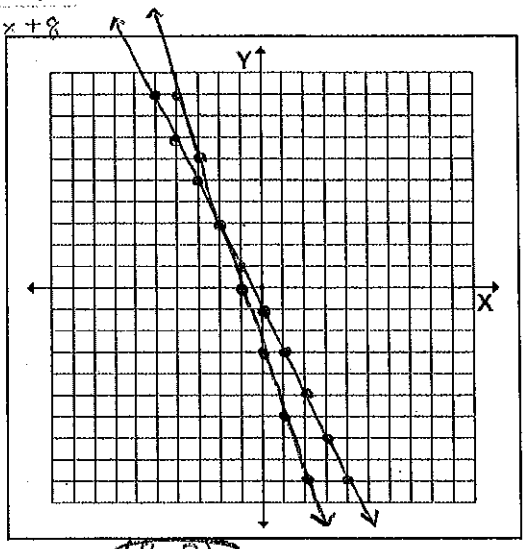
no solution

2. $2x + y = -1$
   $-3x - y = 3$

$2x + y = -1$
$-2x \quad -2x$
$y = -2x - 1$

$-3x - y = 3$
$+3x \quad +3x$
$-y = 3x + 3$
$-1 \quad -1 \quad -1$
$y = -3x - 3$

$y = -2x + 8$



(-2, 3)

For # 3 & 4: Classify the system above as independent/dependent, consistent/inconsistent.

3. inconsistent

4. consistent
   independent

Solve each system of equations by using substitution.

Classify the system as independent/dependent, consistent/inconsistent.

5. $5x - 2y = 8$
   $x - y = 1$

$+y \quad +y$

$x = y + 1$

$5(y+1) - 2y = 8$
$5y + 5 - 2y = 8$
$3y + 5 = 8$
$-5 \quad -5$
$\frac{3}{3}y = \frac{3}{3}$
$y = 1$

$x = y + 1$
$x = (1) + 1$
$x = 2$

5. (2, 1)

Type: consistent
independent

6. $4x - 3y = 14$
   $y = -3x + 4$

$4x - 3(-3x + 4) = 14$
$4x + 9x - 12 = 14$
$+12 \quad +12$
$13x = 26$
$\frac{13}{13}x = \frac{26}{13}$
$x = 2$

$y = -3(2) + 4$
$y = -6 + 4$
$y = -2$

6. (2, -2)

Type: consistent
Independent

Solve each system of equations by using elimination.

Classify the system as independent/dependent, consistent/inconsistent.

7. $2(2x + 3y = 5)$
$3(3x - 2y = 1)$

$4x + 6y = 10$
$9x - 6y = 3$
$13x = 13$
$x = 1$

$3(1) - 2y = 1$
$3 - 2y = 1$
$-3 \quad -3$
$-2y = -2$
$y = 1$

7. $(1, 1)$

Type: consistent independent

8. $2(-6x - 3y = 12)$
$3(8x + 2y = 16)$

$-12x - 6y = 24$
$24x + 6y = 48$
$12x = 72$
$x = 6$

$-6(6) - 3y = 12$
$-36 - 3y = 12$
$+36 \quad +36$
$-3y = 48$
$y = -16$

8. $(6, -16)$

Type: consistent independent

Solve each system of inequalities by graphing.

9. $y > -1$
$y \geq -2x + 1$

10. $x - y \leq 4$
$2x + y < 4$

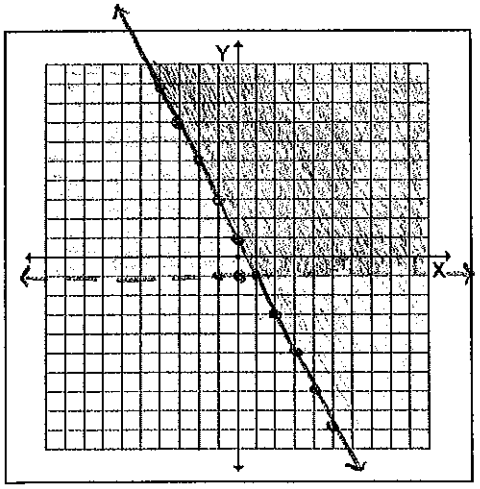
$2x + y < 4$
$-2x \quad -2x$
$y < -2x + 4$

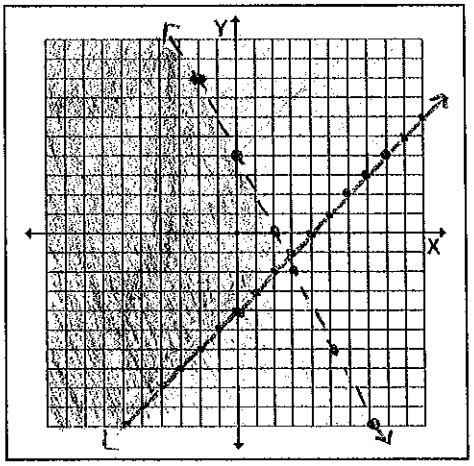
$x - y \leq 4$
$-x \quad -x$
$-y \leq -x + 4$
$y \geq x - 4$

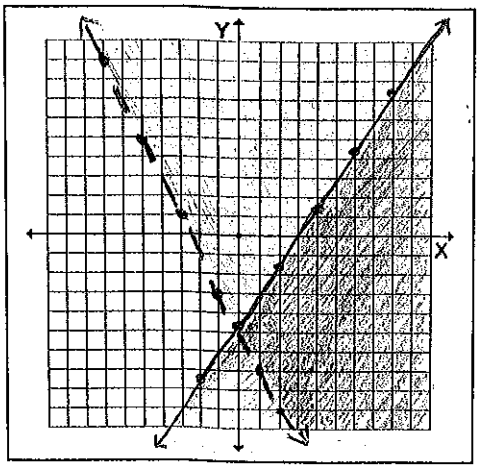
11. $2x + y > -5$
$3x - 2y \geq 9$

$2x + y > -5$
$-2x \quad -2x$
$y > -2x - 5$

$3x - 2y \geq 9$
$-3x \quad -3x$
$-2y \geq -3x + 9$
$y \leq \frac{3}{2}x - 4.5$







Use the system of inequalities: $x \le 6, \quad -4x+3y \le 3, \quad \frac{x}{3}+\frac{3}{3} \le \frac{3}{3}y$

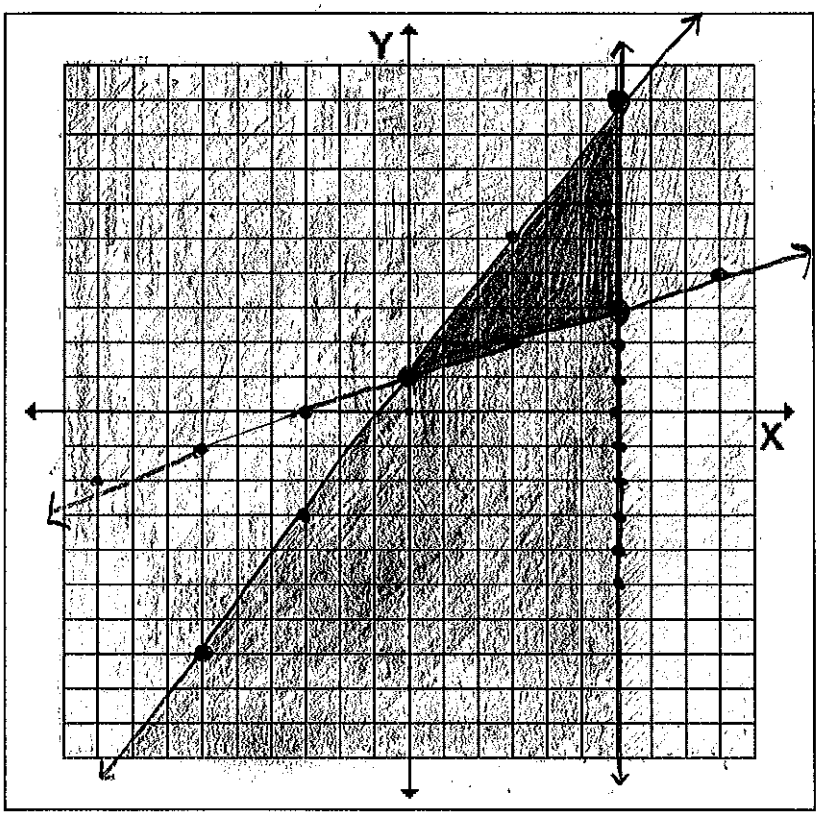
$+4x \quad +4x$

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

$y \ge \frac{1}{3}x+1$

$y \le \frac{4}{3}+1$

12. **Find the coordinates of the vertices of the feasible region.**



12. Vertices: (0,1) (6,3) (6,9)

13. **Find the maximum value of $f(x, y) = 3x + y$ for the feasible region.**

14. **Find the minimum value of $f(x, y) = 3x + y$ for the feasible region.**

(x, y)	3x+y	f(x, y)
(0,1)	3(0)+1	1
(6,3)	3(6)+3	21
(6, 9)	3(6)+9	27

13. Maximum: 27 at (6 , 9) **14.** Minimum: 1 at (0 , 1)

For Questions 15- 17, use the following information. A college arena is selling tickets to students and to the general public. The arena seats 11,000 people. The college reserves at least 7000 tickets for students. Student tickets are $8 each and the general public tickets are $32 each.

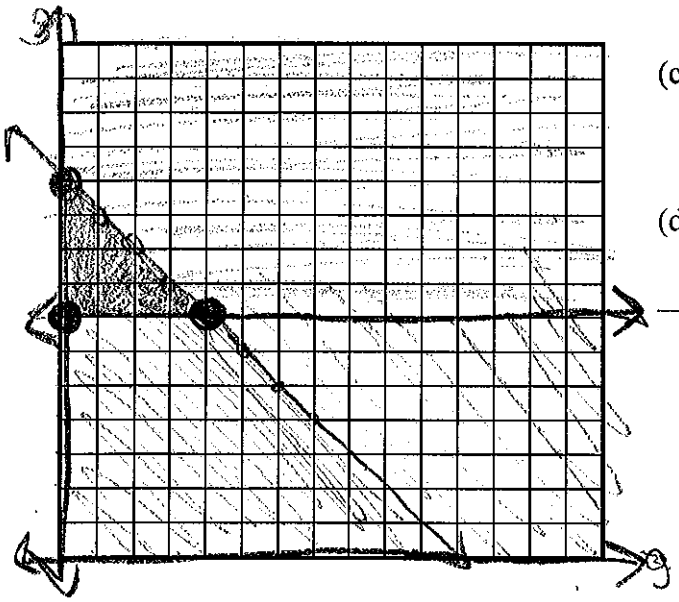
(a) Make a table to organize the information.

	x	y	how much?

15. Write the system of inequalities: $s+g \leq 11{,}000$ $s \geq 0$ $s \geq 7000$ $g \geq 0$

$s+g \leq 11000$
$-g \quad -g$
$s \leq -g+11{,}000$

(b) Graph the feasible region below (be sure to **label your scales**).



(c). Write the profit equation: $f(g,s) = 32g+8s$

(d). List the vertices: $(0,7000)$, $(0,11,000)$, $(4,000,7,000)$

$(0,7000)$	$32(0)+8(7000)$	$56,000$
$(0,11,000)$	$32(0)+8(11,000)$	$88,000$
$(4000,7,000)$	$32(4,000)+8(7000)$	$184,000$

16. How many general public tickets should the college sell to maximize revenue (amount collected)?

$4,000$

17. What is the maximum revenue? $\$184,000$

18. A sports manufacturer makes baseball bats and tennis rackets. It cost $25 to produce each baseball bat and it takes 15 hours to make it. It costs $60 to produce each tennis racket and it takes 6 hours to make it. The store has at most $3000 to spend and at most 600 hours to make them. It makes $45 profit on each baseball bat and $75 profit on each tennis racket. Find the number of each that the manufacturer should produce to maximize profits.

(a) Make a table to organize the information.

	x	y	how much?

Write the system of inequalities: $25b + 60t \leq 3000$; $b \geq 0$

$15b + 6t \leq 600$; $t \geq 0$

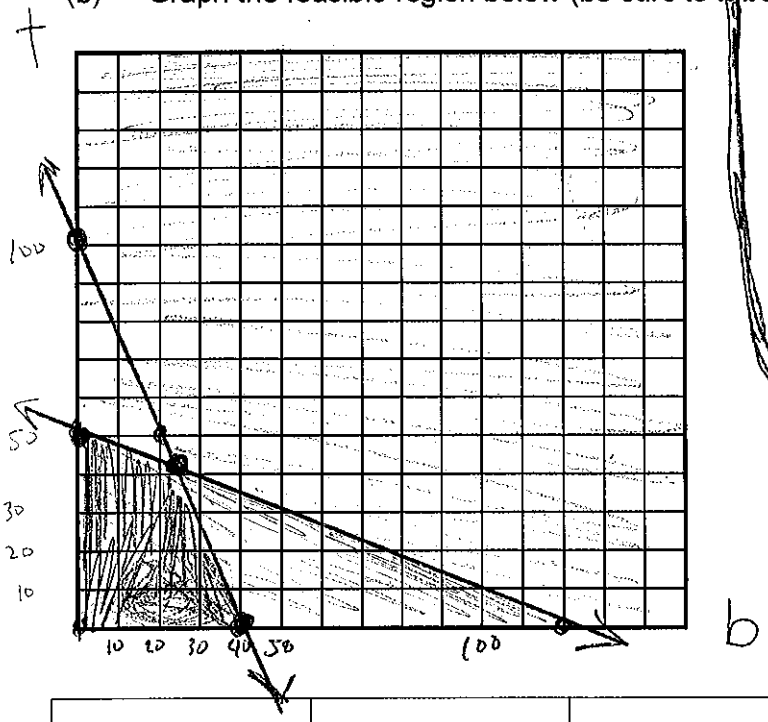
$25b + 60t \leq 3000$

$-25b \quad -25b$

$\frac{60t}{60} \leq \frac{-25b}{60} + \frac{3000}{60}$

$t \leq -\frac{5}{12}b + 50$

(b) Graph the feasible region below (be sure to **label your scales**).



(c). Write the profit equation: $f(b,t) = 45b + 75t$

(d). List the vertices: $(40,0), (0,0), (0,50)$

$(24,40)$

$15b + 6t \leq 600$

$-15b \quad -15b$

$\frac{6t}{6} \leq \frac{-15b}{6} + \frac{600}{6}$

$t \leq -\frac{5}{2}b + 100$

$(40,0)$	$45(40) + 75(0)$	1800
$(0,0)$	$0 + 0$	0
$(0,50)$	$0 + 75(50)$	3750
$(24,40)$	$45(24) + (40)(75)$	4080

$-\frac{5}{2}b + 100 = -\frac{5}{12}b + 50$

$+\frac{5}{2}b \quad -50 \quad +\frac{5}{2}b \quad -50$

$50 = \frac{5}{2}b - \frac{5}{12}b$

$50 = \frac{30}{12}b - \frac{5}{12}b$

$\frac{25}{25}50 = \frac{25}{12}b \cdot \frac{12}{25}$

$b = 24$

$t = -\frac{5}{12}(24) + 50$

$t = -10 + 50 = 40$

Maximum profit of $ 4,080

Selling: 24 bats and 40 tennis rackets