Block: ______   Name: Practice Test

Chapter 6 Test – Linear Equations

Version P

/25

Learning Outcomes	Can Start		Can Partially		Can Do	
1. Can solve linear systems using elimination and substitution						
2. Can solve linear inequalities by graphing them.						
3. Can solve a system of linear inequalities.						
4. Can solve linear inequalities applications in context.						
5. Can optimize the solution to linear inequalities by creating an objective function.						
TEST SCORE	0	1	2	3	4	5

Show all of your work.

PART 1:	Can Start		Can Partially		Can Do	
Can solve linear systems using elimination and substitution						

1. Solve the system by the **elimination** method.

$(x + 4y = 2)$ $\times -2$

$2x + 5y = -2$

$+ \; -2x - 8y = -4$

$-3y = -6$

-3

$\boxed{y=2}$

$x + 4y = 2$

$x + 4(2) = 2$

$x + 8 = 2$

$-8 \quad -8$

$\boxed{x=-6}$

$\boxed{-6, 2}$

Check: $-6 + 4(2) = 2$

$-6 + 8 = 2$

$2 = 2$ ✓

2. Solve the system by the **substitution** method.

$4x - 3y = 10$ ($-4x$, $-4x$)

$3x + 5y = -7$

$-3y = -4x + 10$

-3

$y = \boxed{\frac{4}{3}x - \frac{10}{3}}$

Check: $4(1) - 3(-2) = 10$

$4 + 6 = 10$

$10 = 10$ ✓

$3x + 5\left(\frac{4}{3}x - \frac{10}{3}\right) = -7$

$\left(3x + \frac{20}{3}x - \frac{50}{3} = -7\right) \times 3$

$9x + 20x - 50 = -21$

$29x - 50 = -21$

$+50 \quad +50$

$29x = 29$

$29 \quad 29$

$\boxed{x=1}$

$y = \frac{4}{3}(1) - \frac{10}{3}$

$y = \frac{4}{3} - \frac{10}{3}$

$y = -\frac{6}{3}$

$\boxed{y=-2}$

$\boxed{1, -2}$

3. Solve the system using a **method of your choice**.

$x - \frac{3}{4}y = \frac{1}{4}$ ($+\frac{3}{4}y$, $+\frac{3}{4}y$)

$\left(\frac{5}{3}x - 3y = -\frac{4}{3}\right) \times 3$

$x = \boxed{\frac{3}{4}y + \frac{1}{4}}$

$5x - 9y = -4$

$5\left(\frac{3}{4}y + \frac{1}{4}\right) - 9y = -4$

$\left(\frac{15y}{4} + \frac{5}{4} - 9y = -4\right) \times 4$

$15y + 5 - 36y = -16$

$-5 \quad -5$

$-21y = -21$

$-21 \quad -21$

$\boxed{y=1}$

$x = \frac{3}{4}(1) + \frac{1}{4}$

$x = \frac{3}{4} + \frac{1}{4}$

$\boxed{x=1}$

Check:

$\frac{5}{3}(1) - 3(1) = -\frac{4}{3}$

$\frac{5}{3} - 3 = -\frac{4}{3}$

$\frac{5}{3} - \frac{9}{3} = -\frac{4}{3}$

$-\frac{4}{3} = -\frac{4}{3}$ ✓

$\boxed{1, 1}$

PART 2:	Can Start		Can Partially		Can Do	
Can solve linear inequalities by graphing them.						

1) Solve the inequality by graphing: $-x+y\leq 1$

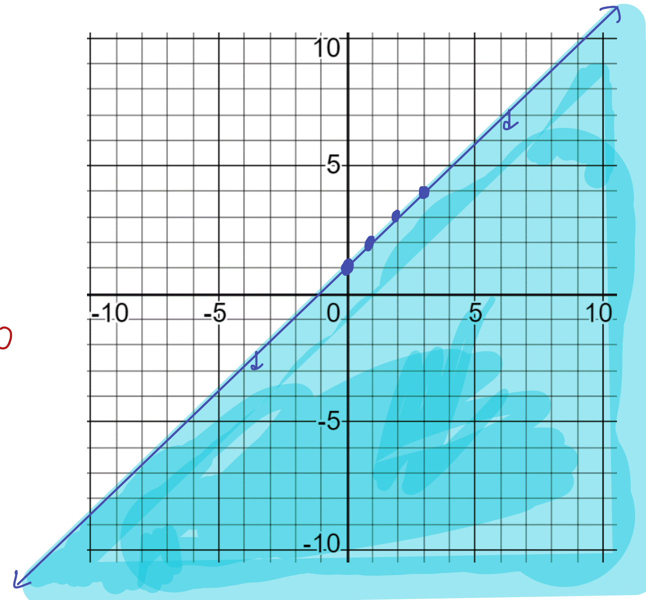
$+x \quad +x$

$y \leq x+1$

$b=1$

$m=1$

- shade below
- solid line



2) Solve the inequality by graphing: $4x-5y<10$

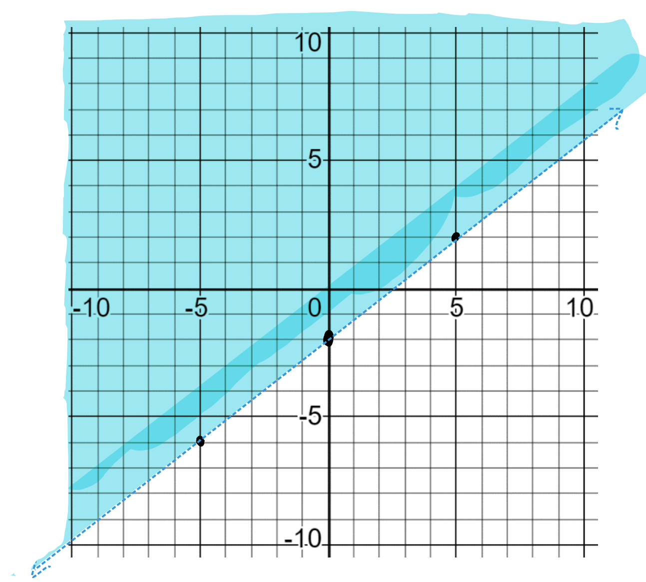
$4x-5y<10$

$-4x \quad -4x$

$\frac{-5y < -4x+10}{-5}$

$\boxed{y > \frac{4}{5}x-2}$

- dotted line
- Shade above



PART 3:	Can Start		Can Partially		Can Do	
Can solve a system of linear inequalities.						

3) Solve the system of inequalities by graphing:

2x-3y≤6 ⟶ $2x - 3y \le 6$

${-2x} \qquad {-2x}$

y<-2x+3

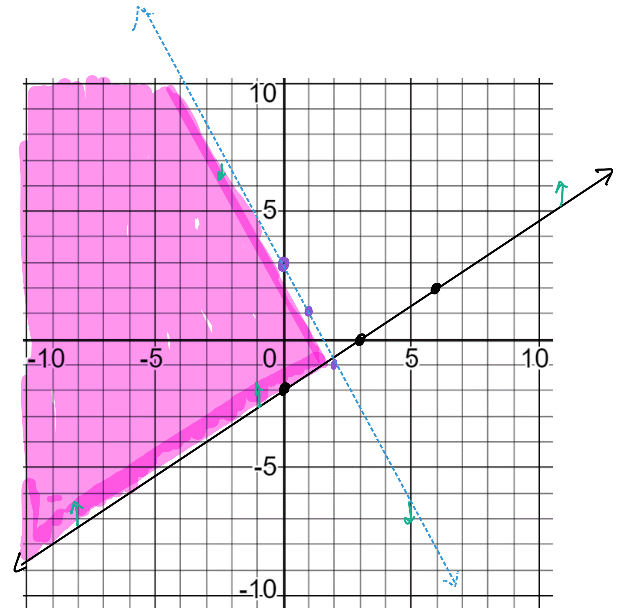
$-3y \le -2x + 6$

$\overline{{-3}}$

$\boxed{y \ge \frac{2}{3}x - 2}$

• solid line
• shade above

• dotted line
• shade below



4) Solve the system of inequalities by graphing:

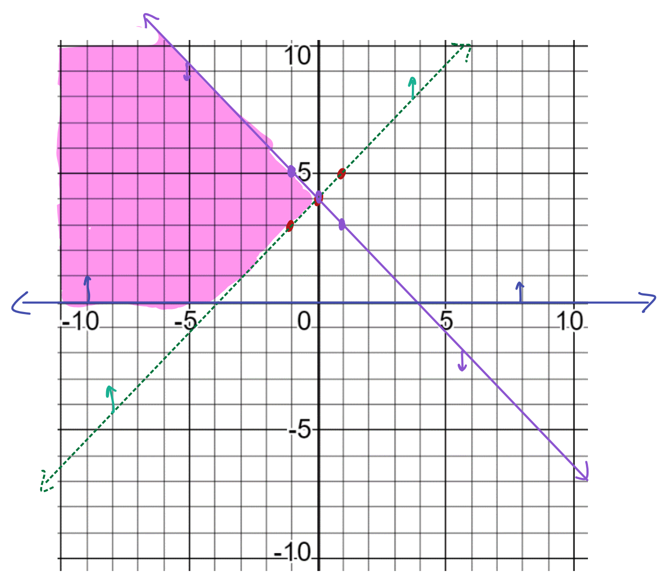
$-x \qquad -x$

x+y≤4 $\qquad y \le -x + 4$

$+x \qquad +x$

-x+y<4 $\qquad y < x + 4$

y≥0



PART 4:	Can Start		Can Partially		Can Do	
Can solve linear inequalities applications in context.						

5) Scarlett can spend up to $120 on souvenir T-shirts from the Olympics. She would like to buy at least 5 T-shirts to give to family and friends. The two styles of T-shirts cost $20 or $15 each. Create two linear inequalities, as well as two common sense restrictions, and graph the system **(with shading).** Then describe two possible ways for Scarlett to meet her requirements.

T-shirt style #1 = x = $20 each

T-shirt style #2 = y = $15 each

x & $y \geq 0$

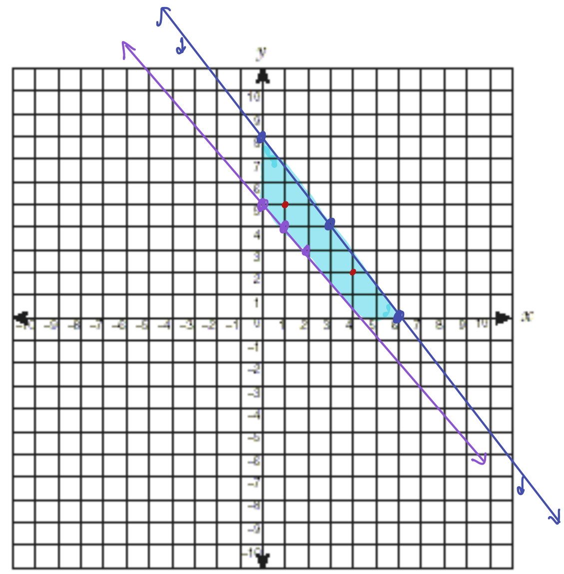
Amount: $x + y \geq 5 \longrightarrow y \geq -x + 5$

Money: $20x + 15y \leq 120$

$-20x \qquad -20x$

$\dfrac{15y \leq -20x + 120}{15}$

$y \leq -\frac{4}{3}x + 8$



Two ways that Scarlett can meet the requirements:

Two possible scenarios (any of the shaded are good)

(1,5) $20(1) + 15(5) \leq 120 \rightarrow 20 + 75 \leq 120$

$95 \leq 120$ ✓

(4,2) $20(4) + 15(2) \leq 120 \rightarrow 80 + 30 \leq 120$

$110 \leq 120$ ✓

PART 5:	Can Start		Can Partially		Can Do	
Can optimize the solution to linear inequalities by creating an objective function.						

6) A farmer raises no more than 5000 of two types of chickens. It costs $0.50 to raise the white chickens and $0.75 to raise the brown chickens, and the total cost cannot exceed $3000.

At the end of six weeks, a white chicken will weigh 3 pounds, and a brown chicken will weigh 4 pounds ***(this info will be used to create your Objective Function)***.

Create and graph a system of inequalities, and use it to find how many of each type of chicken should be raised to have the maximum number of pounds of chickens.

System of Equations:

Let B = brown chickens

Let W = white chickens

P = Pounds

Objective Function

$P = 3w + 4B$

total chix: $w + B \leq 5000$; $-w$; $-w$

$\boxed{B \leq -w + 5000}$

Price: $.5w + .75B \leq 3000$

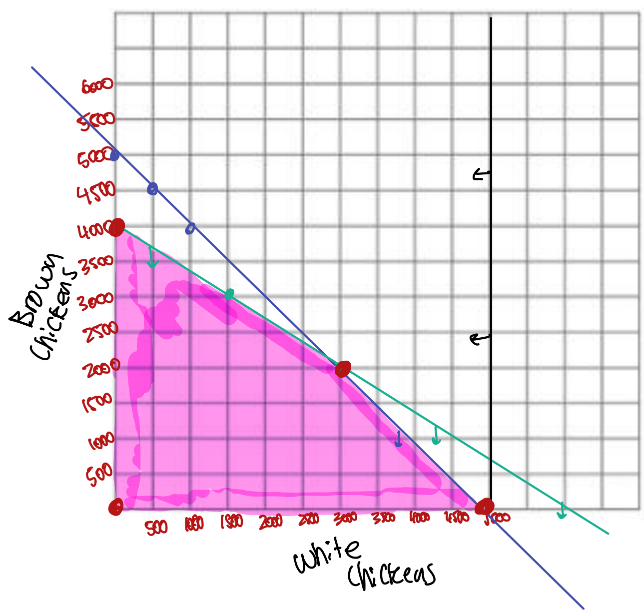
$\left(\frac{1}{2}w + \frac{3}{4}B \leq 3000\right) \times 4$

$2w + 3B \leq 12000$

$-2w$; $-2w$

$\frac{3B \leq -2w + 12000}{3}$

$\boxed{B \leq -\frac{2}{3}w + 4000}$



Objective Function:

Check: (0,0)

(0, 4000)

(3000, 2000)

(5000, 0)

objective function:

$P = 3w + 4B$

$P_{(0,0)} = 3(0) + 4(0) = 0$

$P_{(0,4000)} = 3(0) + 4(4000) = 16000$ lbs

$P_{(3000,2000)} = 3(3000) + 4(2000) = 17,000$ lbs ← maximum value

$P_{(5000,0)} = 3(5000) + 4(0) = 15,000$ lbs

Final Answer: 3000 white & 4000 brown chickens will yield a maximum amount of 17,000 pounds.