Alg. II/Trig. Review 3.1-3.3 Name key

Solve the system using either substitution or elimination methods. Exact answers

1) $\begin{cases} 2x+3y=2 \\ x-2y=8 \end{cases} \cdot -2$

$2x+3y=2$
$-2x+4y=-16$
$7y=-14$
$y=-2$

$x+4=8$
$x=4$

$(4,-2)$

2) $\begin{cases} 2x+5y=16 \\ 3x-7y=24 \end{cases} \cdot -3 \cdot 2$

$-6x-15y=-48$
$6x-14y=48$
$-29y=0$
$y=0$

$2x=16$ $x=8$

$(8,0)$

3) $\begin{cases} 3r-4s=3 \\ r-2s=-4 \end{cases} \cdot -2$

$3r-4s=3$
$2r-4s=-8$
$r=-5$

$-1-2s=-4$
$-2s=-3$
$s=\frac{3}{2}$

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

4) $\begin{cases} 5x-6y=4 \\ 3x+7y=8 \end{cases} \cdot 3 \cdot -5$

$15x-18y=12$
$-15x-35y=-40$
$-53y=-28$
$y=\frac{28}{53}$

$3x+7\left(\frac{28}{53}\right)=8$
$3x+\frac{196}{53}=\frac{424}{53}$
$3x=\frac{228}{53}$
$x=\frac{228}{159}$

$\left(\frac{228}{159},\frac{28}{53}\right)$

5) $\begin{cases} \frac{1}{3}x+\frac{1}{2}y=5 \\ x-\frac{5}{8}y=-1 \end{cases} \cdot 6 \cdot -3$

$2x+3y=30 \cdot 2$
$3x-2y=-3 \cdot 3$
$4x+6y=60$
$+\ 9x-6y=-9$
$13x=51$
$x=\frac{51}{13}$

$\frac{51}{13}-\frac{3}{8}y=-1$
$\frac{51}{13}+\frac{13}{13}=\frac{3}{8}y$
$\frac{64}{13}=\frac{3}{8}y$
$y=\frac{192}{26}=\frac{96}{13}$

$\left(\frac{51}{13},\frac{96}{13}\right)$

6) $\begin{cases} \frac{1}{2}x-\frac{1}{2}y=\frac{3}{2} \\ \frac{5}{6}x-\frac{1}{3}y=\frac{5}{2} \end{cases}$

Work on other sheet

$\left(\frac{55}{31},\frac{-190}{62}\right)$

7) $\begin{cases} \sqrt{2}x-\sqrt{2}y=-2\sqrt{2} \\ 12\sqrt{2}x-\sqrt{2}y=\sqrt{2} \end{cases}$

$\left(\frac{8}{7},\frac{-3\sqrt{6}}{7}\right)$

8) $\begin{cases} 2x-3y=5 \\ -6x+9y=12 \end{cases}$

No Solution

9) $\begin{cases} 3m-\frac{1}{2}r=2 \\ -6m+r=-4 \end{cases}$

Infinite Solutions

10) $\begin{cases} \frac{2}{x}+\frac{3}{y}=-2 \\ \frac{4}{x}-\frac{5}{y}=1 \end{cases}$

(Hint: Let $\frac{1}{x}=a$ and $\frac{1}{y}=b$)

(11) **Air travel** An airline that flies from Los Angeles to Albuquerque with a stopover in Phoenix charges a fare of $90 to Phoenix and a fare of $120 from Los Angeles to Albuquerque. A total of 185 passengers boarded the plane in Los Angeles, and fares totaled $21,000. How many passengers got off the plane in Phoenix? [redacted]

X = # of passengers to phoenix
Y = # of passengers to ALb.

work on other sheet

(12) **Mixing nuts** A merchant wishes to mix peanuts costing $3 per pound with cashews costing $8 per pound to obtain 60 pounds of a mixture costing $5 per pound. How many pounds of each variety should be mixed?

other sheet

(13) **Livestock diet** A rancher is preparing an oat-cornmeal mixture for livestock. Each ounce of oats provides 4 grams of protein and 18 grams of carbohydrates, and an ounce of cornmeal provides 3 grams of protein and 24 grams of carbohydrates. How many ounces of each can be used to meet the nutritional goals of 200 grams of protein and 1320 grams of carbohydrates per feeding?

other sheet

Oats < 4g Prot, 18g carbs X = # oz of oats

Cornmeal < 3g prot, 24g carbs Y = # oz of cornmeal

(14) **Planning production** A small furniture company manufactures sofas and recliners. Each sofa requires 8 hours of labor and $180 in materials, while a recliner can be built for $105 in 6 hours. The company has 340 hours of labor available each week and can afford to buy $6750 worth of materials. How many recliners and sofas can be produced if all labor hours and all materials must be used? [redacted]

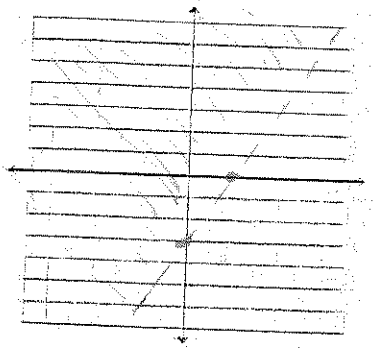
Sofa < 8 Hr Labor, $180 mater cost

recliner < 6 Hr, $105

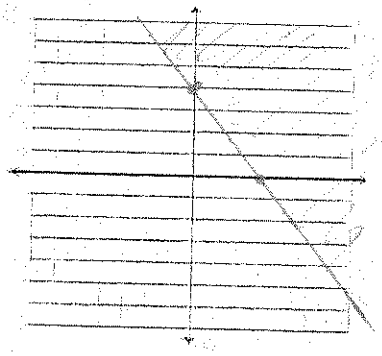
340 Hr Labor
$6750 material
X = # sofas
Y = # of recliners

Sketch the inequality

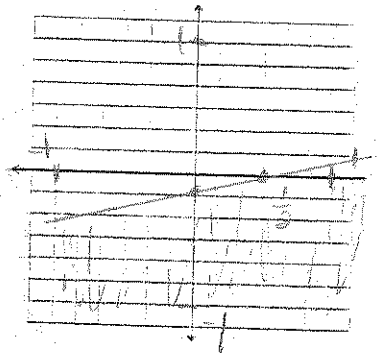
(15) $3x - 2y < 6$



(16) $4x + 3y \geq 12$

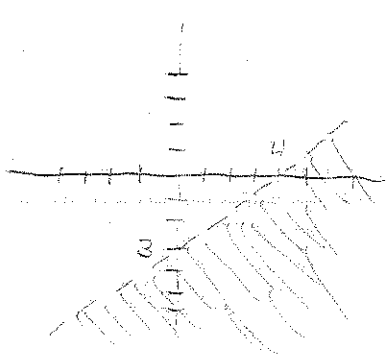


(17) $2x + 3y \geq 2y - 1$
$2y - 9y \geq 1$



(18) Write the inequality graphed below.

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



(6) $\left(\frac{1}{2}x - \frac{1}{5}y = \frac{3}{2}\right)\cdot 10$

$\left(\frac{2}{3}x + \frac{1}{4}y = \frac{5}{12}\right)\cdot 12$

$(5x - 2y = 15)\cdot 3$

$(8x + 3y = 5)\cdot 2$

$15x - 6y = 45$

$+\ 16x + 6y = 10$

$31x = 55$

$x = \frac{55}{31}$

$\frac{1}{2}\left(\frac{55}{31}\right) - \frac{1}{5}y = \frac{3}{2}$

$\frac{55}{62} - \frac{1}{5}y = \frac{3}{2}$

$\frac{55}{62} - \frac{3}{2} = \frac{1}{5}y$

$\frac{55}{62} - \frac{93}{62} = \frac{1}{5}y$

$\frac{-38}{62} = \frac{1}{5}y$

$\frac{-190}{62} = y$

$\left(\frac{55}{31}, \frac{-190}{62}\right)$

(8) $(2x - 3y = 5)\cdot 3$

$-6x + 9y = 10$

$6x - 9y = 15$

$+\ -6x + 9y = 10$

$0 = 25$

NO solution

(9) $(3m - 4n = 2)\cdot 2$

$-6m + 8n = -4$

$6m - 8n = 4$

$+\ -6m + 8n = -4$

$0 = 0$

Infinite solutions

(7) $\left[\sqrt{3}x - \sqrt{2}y = 2\sqrt{3}\right]\cdot\sqrt{3}$

$\left[2\sqrt{6}x + \sqrt{3}y = \sqrt{2}\right]\cdot\sqrt{2}$

$3x - \sqrt{6}y = 6$

$+\ 4x + \sqrt{6}y = 2$

$7x = 8$

$x = \frac{8}{7}$

$\left(\frac{8}{7}, \frac{-3\sqrt{6}}{7}\right)$

$\sqrt{3}\left(\frac{8}{7}\right) - \sqrt{2}y = 2\sqrt{3}$

$\frac{8\sqrt{3}}{7} - \sqrt{2}y = 2\sqrt{3}$

$\frac{8\sqrt{3}}{7} - \frac{14\sqrt{3}}{7} = \sqrt{2}y$

$\frac{-6\sqrt{3}}{7} = \sqrt{2}y$

$\frac{\sqrt{2}}{\sqrt{2}}\cdot\frac{-6\sqrt{3}}{7\sqrt{2}} = y$

$\frac{-6\sqrt{6}}{14} = \frac{-3\sqrt{6}}{7}$

(10) $(2a + 3b = -2)\cdot -2$

$4a - 5b = 1$

$-4a - 6b = 4$

$+\ 4a - 5b = 1$

$-11b = 5$

$b = \frac{5}{-11}$

$2a + 3\left(\frac{5}{-11}\right) = -2$

$2a - \frac{15}{11} = -2$

$2a = \frac{-22}{11} + \frac{15}{11}$

$2a = \frac{-7}{11}$

$a = \frac{-7}{22}$

$a = \frac{1}{x}$

$\frac{-7}{22} = \frac{1}{x}$

$x = \frac{22}{-7}$

$b = \frac{1}{y}$

$\frac{5}{-11} = \frac{1}{y}$

$y = \frac{-11}{5}$

$\left(\frac{22}{-7}, \frac{-11}{5}\right)$

(11) $x + y = 185$ $\quad x = 185 - y$

$90x + 120y = 21000$

$90(185 - y) + 120y = 21000$

$16650 - 90y + 120y = 21000$

$30y = 4350$

$y = 145$

$x = 185 - 145$

$x = 40$

(12) x = # Lbs of peanuts

y = # Lbs of cashews

$3x + 8y = 5 \cdot 60$

$x + y = 60$

$\begin{cases} 3x + 8y = 300 \\ (x + y = 60) \cdot -3 \end{cases}$

$3x + 8y = 300$

$-3x - 3y = -180$

$5y = 120$

$y = 24$

$x + 24 = 60$

$x = 36$

36 Lbs of Peanuts
24 Lbs of cashews

(13) $(4x + 3y = 200) \cdot -8$

$18x + 24y = 1320$

$-32x - 24y = -1600$

$+ \quad 18x + 24y = 1320$

$-14x = -280$

$x = 20$

$4(20) + 3y = 200$

$80 + 3y = 200$

$3y = 120$

$y = 40$

20 oz Oats
40 oz Cornmeal

(14) $(8x + 6y = 340) \cdot 35$

$(180x + 105y = 6750) \cdot -2$

$280 + 210y = 11900$

$-360x - 210y = -13500$

$-80x = -1600$

$x = 20$

$160 + 6y = 340$

$6y = 180$

$y = 30$

20 sofas
30 recliners