

Chapter 3 Review

Solve each system by graphing (Point of Intersection)

**Remember that the system must be in $y =$ form to graph

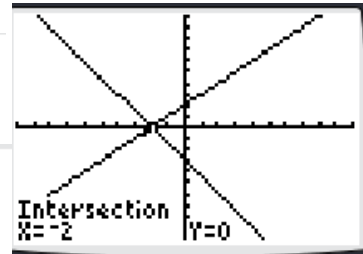
1. $\begin{cases} Y = 2X + 1 \\ Y = 4X + 5 \end{cases}$ (-2, -3)

2. $\begin{cases} Y = 3X - 5 \\ Y = 6X + 4 \end{cases}$ (-3, -14)

3. $\begin{cases} 3X + 2Y = -6 \\ X - Y = -2 \end{cases} \rightarrow Y = X + 2$

$$\begin{array}{r} 3X + 2Y = -6 \\ -3X = -3X \\ \hline 2Y = -3X - 6 \\ Y = -\frac{3}{2}X - 3 \end{array}$$

```
Plot1 Plot2 Plot3
Y1=-3/2X-3
Y2=X+2
U2=
```



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CALCULATE
1: Value
2: zero
3: minimum
4: maximum
5: intersect
6: dy/dx
7: ∫f(x)dx
    
```

(-2, 0)

4. The spreadsheet shows the monthly revenue and monthly expenses for a new business. Find a linear model for monthly revenue and a linear model for expenses. Then use the models to predict the month when revenue will equal expenses. (Hint: February = 2, March = 3, etc)

	A	B	C
	Month	Revenue	Expenses
2	Feb	8000	35000
3	Mar	12000	33000
4	Apr	13000	34000
5	May	18000	32000
6	Jun	20000	31000

Rev: $y = 3000x + 2200$

Expenses: $y = -900x + 36600$

```
Plot1 Plot2 Plot3
Y1=3000X+2200
Y2=-900X+36600
U2=
```

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LinReg(ax+b) L1,
L2
```

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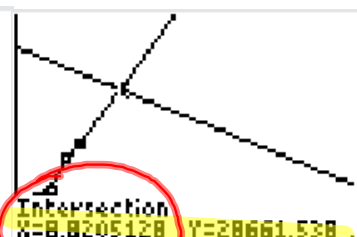
LinReg
y=ax+b
a=-900
b=36600
    
```

```

MEMORY
4: ZDecimal
5: ZSquare
6: ZStandard
7: ZTrig
8: ZInteger
9: ZoomStat
Z: ZoomFit
    
```

```

WINDOW
Xmin=1.6
Xmax=25
Xscl=1
Ymin=5960
Ymax=40000
Yscl=1
Xres=1
    
```



August

Solve the system.

5. $\begin{cases} 3X + 5Y = 10 \\ Y = -4 \end{cases}$ Subst. $(10, -4)$

6. $\begin{cases} 4X + 3Y = 12 \\ X = 5Y - 20 \end{cases}$ subst $(0, 4)$

7. $\begin{cases} 8X + Y = 17 \\ X + 4Y = 37 \end{cases}$ subst $(1, 9)$

8. $\begin{cases} 2X + Y = 13 \\ X - Y = -4 \end{cases}$ Elim $(3, 7)$

7. $\begin{cases} 8X + Y = 17 \text{ ①} \\ X + 4Y = 37 \text{ ②} \end{cases}$ solve for y: $Y = -8X + 17$

Subst ① in ②

$$X + 4(-8X + 17) = 37$$

$$X - 32X + 68 = 37$$

$$-31X = -31$$

$$X = 1$$

Subst $X=1$ in ①

$$Y = -8(1) + 17$$

$$Y = 9$$

$$(1, 9)$$

9. $\begin{cases} 2X + 3Y = 4 \\ 4X + 6Y = 9 \end{cases} \xrightarrow{-2} \begin{cases} -4X - 6Y = -8 \\ 4X + 6Y = 9 \end{cases}$

$$\underline{\hspace{1.5cm}} \quad 0 = 1 \text{ (F)}$$

No Solution

10. $\begin{cases} X + Y = 1/3 \\ X - Y = 1/4 \end{cases}$ $\left(\frac{4}{12}\right)$ $\left(\frac{3}{12}\right)$

$$\frac{1}{2} \left(2X = \frac{7}{12} \right) \frac{1}{2}$$

$$X = \frac{7}{24}$$

$$X + Y = \frac{1}{3}$$

$$\frac{7}{24} + Y = \frac{1}{3} \left(\frac{8}{24}\right)$$

$$Y = \frac{8}{24} - \frac{7}{24} = \frac{1}{24}$$

$$\left(\frac{7}{24}, \frac{1}{24}\right)$$

11. A group of 60 people went to a game. There were twice as many men as women in the group. Set up a system of equations to represent the number of women and men and solve.

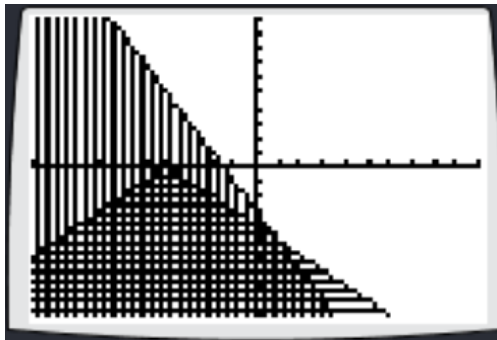
$$\begin{array}{l}
 x = \text{women} \quad y = \text{men} \\
 \left\{ \begin{array}{l} x + y = 60 \text{ (1)} \\ y = 2x \text{ (2)} \end{array} \right. \quad \text{subst (2) in (1)} \\
 \begin{array}{l} x + 2x = 60 \\ 3x = 60 \\ x = 20 \\ \text{Women} \end{array} \\
 y = 2x = 2(20) = 40 \\
 \text{men}
 \end{array}$$

Solve by graphing.

12. $\begin{cases} Y < -X + 1 & \text{Dashed; Below} \\ Y \geq (3/4)X + 6 & \text{Solid; Above} \end{cases}$
13. $\begin{cases} X + Y \leq 4 & (y \leq -x + 4) \text{ Solid; Below} \\ Y < 6 & \text{Dashed; Below (Horiz)} \end{cases}$
14. $\begin{cases} Y > X - 4 \\ Y < (1/3)X \end{cases}$
15. $\begin{cases} Y > -2 \\ X < 1 \end{cases}$
16. $\begin{cases} -2X < Y < 3 & (y < -2x - 3) \text{ Dashed; Below} \\ Y \leq -|X + 4| & \text{Solid; Below} \end{cases}$

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Plot1 Plot2 Plot3
Y1 = -2X-3
Y2 = -abs(X+4)
Y3 =
  
```



17. Jenna spends at most 150 min a night on math and science homework. She spends at least 60 min on math. Write and solve a system of inequalities to model how she allots her time for these two subjects.

$$\begin{array}{l}
 x = \text{science} \\
 y = \text{math} \\
 \left\{ \begin{array}{l} x + y \leq 150 \\ y \geq 60 \end{array} \right.
 \end{array}$$

Solve the system.

$$18. \begin{cases} 9a - 3b = 3 \\ 3(-3a + b = -1) \end{cases} \rightarrow \begin{array}{l} 9a - 3b = 3 \\ \underline{-9a + 3b = -3} \\ 0 = 0 \end{array} \quad \begin{array}{l} \text{Infinite} \\ \text{Solutions} \end{array}$$

$$19. \begin{cases} 3m + 4n = -13 \\ 5m + 6n = -19 \end{cases} \quad (1, -4)$$

$$20. \begin{cases} 7x + 5y = 18 \\ -7x - 9y = 4 \end{cases} \quad \left(\frac{13}{2}, -\frac{11}{2}\right)$$

21. At Renaldi's Pizza, a soda and two slices of the pizza-of-the-day cost \$10.25. A soda and four slices of the pizza-of-the-day cost \$18.75. Write a system of equations to model the information and find the cost of each item.

$$\begin{array}{l} x = \text{soda} \\ y = \text{pizza} \end{array} \quad \begin{cases} x + 2y = 10.25 \\ x + 4y = 18.75 \end{cases} \quad (1.75, 4.25)$$

22. A bookstore took in \$167 on the sale of 5 copies of a new cookbook and 3 copies of a new novel. The next day it took in \$89 on the sale of 3 copies of the cookbook and 1 copy of the novel. Set up a system of equations to model the data and use it to find out the price of each book.

$$x = \text{cookbook} \quad y = \text{novel} \quad (25, 14)$$

23. A psychologist needs at least 40 subjects for her experiment. She cannot use more than 30 children. Write and graph a system of inequalities.

$$x = \text{adults} \quad y = \text{children} \quad \begin{cases} x + y \geq 40 \\ y \leq 30 \end{cases}$$

24. A 24-hour radio station plays only classical music, jazz, talk programs, and news. It plays at most 12 h of music per day, of which at least 4 h is classical. Jazz gets at least 25% as much time as classical. Write and graph a system of inequalities.

$$\begin{array}{l} x = \text{classical} \\ y = \text{jazz} \end{array} \quad \begin{cases} x + y \leq 12 \\ x \geq 4 \\ y \geq 0.25x \end{cases}$$

25. Each order of lasagna or ravioli at Casa Italia weighs 1 lb and consists of meat filling wrapped in pasta. On Tuesday evening, the restaurant served 40 orders of ravioli and 60 orders of lasagna and used 60 lb of meat filling. On Wednesday evening, it sold 60 orders of ravioli and 30 orders of lasagna and used 50 lb of meat filling. How much meat filling is used in an order of ravioli and how much is used in an order of lasagna?

$x = \text{ravioli}$ $y = \text{lasagna}$ $\left(\frac{1}{2}, \frac{2}{3}\right)$

Solve the systems:

26. $\begin{cases} y = x + 3 \\ 5x + y = 9 \end{cases}$
 $(1, 4)$

27. $\begin{cases} 4x + 3y = -6 \\ 5x - 6y = -27 \end{cases}$
 $(-3, 2)$

28. $\begin{cases} x + 5y = 1 \\ 2x = 2 - 10y \end{cases}$
 Infinite

29. $\begin{cases} 0.3x + 0.4y = 0.8 \\ 0.7x - 0.8y = -6.8 \end{cases}$
 $(-4, 5)$

30. $\begin{cases} x + 2y = 13 \\ 2y = 7 - x \end{cases}$
 No Solution

31. $\begin{cases} x + 3y = 9 \\ 9y + 3x = 27 \end{cases}$
 Infinite

32. $\begin{cases} x \leq 8 \\ y \leq 5 \\ x \geq 0, y \geq 0 \end{cases}$ Vertices: $(0,0)$ $(8,0)$ $(8,5)$ $(0,5)$
 $C = 0$ $(0,0)$

Minimum for
 $C = x + 5y$

33. $\begin{cases} 3x + 2y \leq 12 & y \leq -\frac{3}{2}x + 6 \\ x + y \leq 5 & y \leq -x + 5 \\ x \geq 0, y \geq 0 \end{cases}$

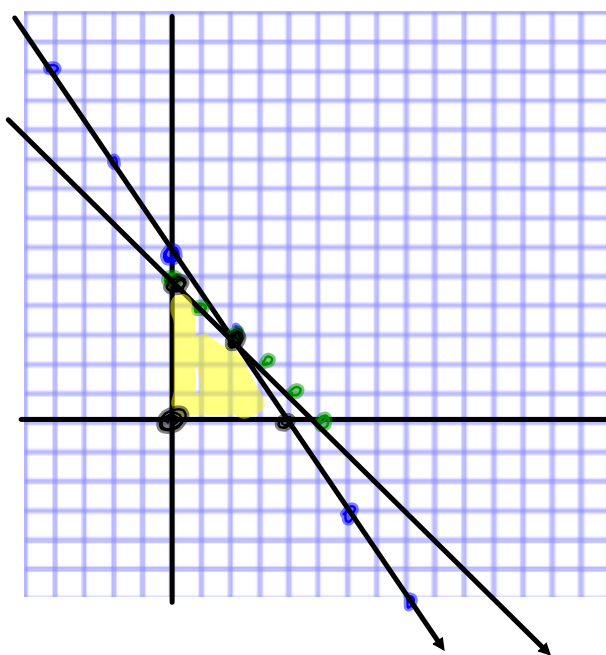
Maximum for
 $P = 3x + 5y$

$(0,0): P = 0$

$(4,0): P = 12 + 0 = 12$

$(2,3): P = 6 + 15 = 21$

$(0,5): P = 0 + 25 = 25$



34.
$$\begin{cases} x \geq 2 \\ y \geq 0 \\ 3x + 2y \geq 12 \end{cases}$$

Minimum for
 $C = 4x + y$

Vertices: $(4, 0)$ $(2, 3)$
 $C = 11$ $(2, 3)$