1. Solve by graphing:
\[ \begin{align*}
X + 2y &= 10 \\
2x + 4y &= 10
\end{align*} \]
\[ \begin{align*}
2y &= -x + 10 \\
y &= -\frac{1}{2}x + 5
\end{align*} \]
\[ \begin{align*}
4y &= -2x + 40 \\
y &= -\frac{1}{2}x + 20
\end{align*} \]

2. Solve by graphing:
\[ \begin{align*}
Y &= \frac{1}{2}x + 2 \\
Y &= -x + 5
\end{align*} \]

3. Without graphing, state whether there is 1 solution, no solutions, or infinitely many solutions:
\[ \begin{align*}
X + y &= 4 \\
2x + 2y &= 8
\end{align*} \]
\[ \begin{align*}
y &= -x + 4 \\
2y &= -2x + 8
\end{align*} \]
\[ y = -x + 4 \]

4. Solve with substitution:
\[ \begin{align*}
H &= 6g - 4 \\
H &= -2g + 28
\end{align*} \]
\[ \begin{align*}
6g - 4 &= -2g + 28 \\
+2g &= +2g
\end{align*} \]
\[ \begin{align*}
8g - 4 &= 28 \\
+4 + y
\end{align*} \]
\[ 8g = 32 \]
\[ g = 4 \]
\[ h = 10\cdot4 - 4 = 20 \]
\[ (4, 20) \]
5. Solve with substitution:
\[ X = 4y + 11 \]
\[ 8x - 6y = 36 \]

\[
\begin{align*}
8(4y+11) - 6y &= 36 \\
32y + 88 - 6y &= 36 \\
26y + 88 &= 36 \\
26y &= -52 \\
y &= -2 \\
x &= 4(-2) + 11 = 3 \\
\end{align*}
\]

6. Solve with substitution:
The length of a rectangle is 3 in more than twice the width. The perimeter is 66 in. Find the length and width.

\[
L = (3 + 2w) \\
L = 3 + 2(10) = 23 \\
2L + 2w = 66 \\
\]

\[
\begin{align*}
2(3 + 2w) + 2w &= 66 \\
6w + 2w &= 66 \\
8w &= 66 \\
w &= 10 \\
L &= 3(10) = 30 \\
\end{align*}
\]

7. Solve with elimination

The sum of two numbers is 96. The difference is 24. Find the two numbers

\[
\begin{align*}
x + y &= 96 \\
x - y &= 24 \\
\end{align*}
\]

\[
\begin{align*}
2x &= 120 \\
x &= 60 \\
60 + y &= 96 \\
y &= 36 \\
\end{align*}
\]

8. Solve with elimination: You have a pocketful of quarters and dimes, 41 all together. If you have $6.50, how many quarters and how many dimes do you have?

\[
Q + D = 41 \\
25Q + 10D = 650 \\
\]

\[
\begin{align*}
25(41-D) + 10D &= 650 \\
1025 - 25D + 10D &= 650 \\
-15D + 1025 &= 650 \\
-15D &= -375 \\
D &= 25 \\
Q + 25 &= 41 \\
Q &= 16 \\
\end{align*}
\]
9. Solve with elimination:

You are at Taco Bell and are REALLY hungry for nachos. Regular Nachos are $1.19 and Nachos Supreme are $2.39. You buy 12 orders of nachos all together. If you spend $22.68 (don't consider tax) how many of each nachos did you buy?

\[1.19R + 2.39S = 22.68\]
\[1.19R + 2.39(12 - R) = 22.68\]
\[2.39S = 22.68 - 2.39R + 1.19R = 22.68\]
\[-1.2R = -10\]
\[S = 7\]
\[R = 5\]

10. Solve with elimination

\[3x + y = 12\]
\[4x - y = 9\]
\[-7x + 21\]
\[x = 3\]
\[y = 3\]
\[(3, 3)\]

11. Solve with elimination

\[(2x + 18y = -9) - 2\]
\[4x + 18y = -27\]
\[-4x - 36y = 18\]
\[4x + 18y = -27\]
\[-18y = -9\]
\[y = \frac{1}{2}\]

\[4x + 18\frac{1}{2} = -27\]
\[4x + 9 = -27\]
\[4x = -36\]
\[x = -9\]
\[(-9, \frac{1}{2})\]

12. Solve with elimination

\[(9x + 5y = 34) - 2\]
\[(8x - 2y = -2) - 5\]
\[18x + 10y = 68\]
\[40x - 10y = -20\]
\[S8x = 88\]
\[x = 1\]
\[9 - 1 + 5y = 34\]
\[-9\]
\[-9y = 25\]
\[5y = 25\]
\[y = 5\]
\[(1, 5)\]
13. Solve with any method:
   \[ X = 12y - 14 \]
   \[ 3y + 2x = 26 \]
   \[ 3y + 2(12y - 14) = 26 \]
   \[ 3y + 24y - 28 = 26 \]
   \[ 27y = 54 \]
   \[ y = 2 \]
   \[ X = 12 \cdot 2 - 14 = 10 \]

15. Solve with any method:
   \[ -3x + 2y = 12 \]
   \[ 3x - 2y = -12 \]
   \[ 0x + 0y = 0 \]

16. \[ A - 3B + 3C = -4 \]
    \[ 2A + 3B - C = 15 \]
    \[ 4A - 3B - C = 19 \]
    \[ 3A + 2C = 11 \]
    \[ 3A + 2C = 11 \]
    \[ 0A - 2C = 3y \]
    \[ 9A = 45 \]
    \[ A = 5 \]
    \[ 2C = -4 \]
    \[ C = -2 \]
    \[ 5 - 3B + 3 \cdot -2 = -4 \]
    \[ -3B - 1 = -4 \]
    \[ -3B = -3 \]
    \[ B = 1 \]
    \[ (5, 1, -2) \]
17. \(3x - y \leq -2\) \(y > \frac{1}{4}x - 3\)

18. \(x \geq -3\) \(y < -x + 4\)

19. Solve any method:
\[
\begin{align*}
3y + 6 &= 5x \\
-2y - 4x &= -18
\end{align*}
\]
\[
\begin{align*}
10x - 60y &= 12 \\
12x + 60y &= 54 \\
32x &= 60 \quad | \quad x = 3
\end{align*}
\]

20. Solve any method:
\[
\begin{align*}
4y - x &= 12 \\
3x + 9 &= y
\end{align*}
\]
\[
\begin{align*}
4(3x + 9) - x &= 12 \\
12x + 3x - x &= 12 \\
14x &= 24 \\
x &= \frac{24}{14} = \frac{12}{7}
\end{align*}
\]

21. Solve using substitution:
\[
x = 5y + 1
\]
\[
3x - y = 45
\]
\[
\begin{align*}
3(5y + 1) - y &= 45 \\
15y + 3 - y &= 45 \\
14y &= 42 \\
y &= 3
\end{align*}
\]
\[
(16, 3)
\]

22. You have $50 in your savings account and save $25 each week. Your sister has $200 and spends $15 each week. When will you have the same amount of money?

\[
y = 25x + 50 \quad y = -15x + 200 \quad 25x + 50 = -15x + 200 \\
40x = 150 \\
x = \frac{150}{40} = 3.75 \text{ weeks}
\]
23. You have a total of 21 coins, all nickels and dimes. The total value is $1.70. Find the number of nickels that you have.

\[
\begin{align*}
\text{N + D} &= 21 \\
5N + 10D &= 170 \\
\text{N} &= 8
\end{align*}
\]

24. You start a cake business. You charge $45 per cake. You had to buy $400 in equipment, and it costs you $8.50 to bake and decorate each cake. How many cakes do you need to sell to break even?

\[
\begin{align*}
y &= 8.50x + 400 \\
y &= 45x \\
8.50x + 400 &= 45x \\
8.50x &= 400 \\
x &= \frac{400}{8.50} \\
x &= 47.06
\end{align*}
\]

25. You invest $12,000 in equipment to manufacture a new board game. Each game costs $2.50 to manufacture and sells for $18. How many board games do you need to sell to break even?

\[
\begin{align*}
y &= 18x \\
18x &= 2.50x + 12000 \\
15.50x &= 12000 \\
x &= \frac{12000}{15.50} \\
x &= 771.69
\end{align*}
\]

26. To get to a campsite 12 miles away you paddle against the current for 4 hours. During your return trip you paddle with the current and you travel the same distance in 3 hours. Find the speed of the river, and your speed in still water. (hint...what is your average speed each way?)

\[
\begin{align*}
\frac{12}{4} &= 3 \\
\frac{12}{3} &= 4
\end{align*}
\]

27. The perimeter of a rectangle is 114 feet. Its length is three more than twice the width. Find the dimensions of the rectangle.

\[
\begin{align*}
L &= 6 + 2W \\
P &= 2L + 2W \\
114 &= 2(6 + 2W) + 2W \\
114 &= 12 + 4W + 2W \\
102 &= 6W \\
W &= 17
\end{align*}
\]

28. You fly to Los Angeles with a headwind and the average speed is 650 miles per hour. The return trip home you are with a tailwind and can average 880 miles per hour. Find the speed of the plane and the speed of the wind.

\[
\begin{align*}
P - W &= 650 \\
P + W &= 880 \\
2P &= 1530 \\
P &= 765
\end{align*}
\]