Explain how to graph in slope-intercept form: \( y = mx + b \). Start by plotting \( b \), the y-intercept. From there apply the slope, \( m \), rise over run.

State the slope and y-intercept, then graph:

1. \( y = -\frac{3}{2}x + 5 \)
   - \( m = -\frac{3}{2} \)
   - \( b = 5 \)

2. \( y = 3x - 4 \)
   - \( m = 3 \)
   - \( b = -4 \)

3. \( 4y = -3x + 12 \)
   - \( y = -\frac{3}{4}x + 3 \)
   - \( m = -\frac{3}{4} \)
   - \( b = 3 \)

4. \( -2x + y = x - 5 \)
   - \( y = 3x - 5 \)
   - \( m = 3 \)
   - \( b = -5 \)

What is the slope of a horizontal line? \( 0 \)  
What is the slope of a vertical line? \( \text{undefined} \)

4. \( y = 4 \) is a horizontal line with a slope of \( 0 \)

5. \( x = -16 \) is a vertical line with a slope undefined.
Hey Vux!

6. $y = -3$

7. $x = 4$

8. $y = 6$

9. $x = -5$

Explain how to use the Standard form of an equation to find the $x$ and $y$-intercepts, and how to graph the intercepts:

$$Ax + By = C$$

Plug in 0 for $y$, solve for $x$ ($x, 0$)

Plug in 0 for $x$, solve for $y$ ($0, y$)

Find the $x$ and $y$ intercepts and graph:

$$
\begin{align*}
3x - y &= 6 \\
3(0) - y &= 6 \\
y &= -6 \\
x &= -2 \\
X-\text{int} &\rightarrow (-2, 0) \\
Y-\text{int} &\rightarrow (0, -6) \\
(3x - y &= 6) \\
-x + 4y &= 6 \\
y &= 1.5 \\
x &= -6 \\
X-\text{int} &\rightarrow (-6, 0) \\
Y-\text{int} &\rightarrow (0, 1.5) \\
3y + 5x &= 12 \\
5x &= 12 \\
x &= 2.4 \\
Y-\text{int} &\rightarrow (0, 2.4) \\
3y &= 12 \\
y &= 4 \\
(x, 0) &\rightarrow (0, 4)
\end{align*}
$$
24. Write an equation in standard form to model the situation: You have $5.00 in your wallet. Gummy bears are $0.10 each and airheads are $0.75 each.

\begin{align*}
\text{Gummy bears} &= x \quad \text{airheads} = y \\
10x + 0.75y &= 5 \\
10x + 7.5y &= 500
\end{align*}

Write the point slope formula. Explain how to use the formula to graph a line.

\[ y - y_1 = m (x - x_1) \]

Graph each equation in point slope form:

25. \( y - 3 = -\frac{2}{3}(x + 4) \)
   Point \((-4, 3)\) \( m = -\frac{2}{3} \)

26. \( y + 2 = -3(x + 5) \)
   Point \((-5, -2)\) \( m = -3 \)

27. \( y - 4 = \frac{3}{2}(x - 1) \)
   Point \((1, 4)\) \( m = \frac{3}{2} \)

Write an equation in A. point slope form  
B. slope-intercept form

28. slope = 2 through \((-4, 5)\)
   A) \( y - 5 = 2(x + 4) \)
   B) \( y - 8 = 2x + 8 \)
   \( y = 2x + 13 \) 

29. Slope = \(-\frac{3}{4}\) through \((-9, 7)\)
   A) \( y - 7 = \frac{3}{4}(x + 9) \)
   B) \( y - 7 = -\frac{3}{4}x - 3 \)
   \( y = -\frac{3}{4}x + 4 \)

30. Slope = \(\frac{3}{4}\) through \((2, -5)\)
   A) \( y + 5 = \frac{3}{4}(x - 2) \)
   B) \( y + 5 = \frac{3}{4}x - \frac{3}{2} \)
   \( y = \frac{3}{4}x - \frac{13}{2} \)
Explain what the directions "write an equation in standard form using integers" means to do:

* x and y on one side, make sure x is positive.
* constant on opposite side.
* no decimals or fractions!

Write each equation in standard form using integers:

13. \(3y = x + 9\)
   \[-9 = x - 3y\]

14. \[\frac{2x + 4y}{4} = \frac{1}{4}\]
   \[2x + 110y = 1\]

15. \[-2x + 7 = -\frac{1}{5}y\]
   \[-10x + 35 = -y\]
   \[+10x\]
   \[+10x\]
   \[35 = 10x - y\]

16. \[\frac{2}{3} - \frac{1}{5}y = \frac{3}{5}x\]
   \[10 - 3y = 9x\]
   \[+8y + 3y\]
   \[10 = 9x + 3y\]

17. \[5y - \frac{1}{2} = 2x\]
   \[-10y - 1 = 4x\]
   \[-10y - 10y\]
   \[-1 = 4x - 10y\]

18. \[2x + 3y = 12\]
   Already in standard form!

19. \[\frac{1}{6} = 2x - \frac{1}{3}y\]
   \[6 = 12x - 2y\]

20. \[3y = -\frac{4}{7} + \frac{2}{3}x\]
   \[10y + 12 = 14x\]

Formula for calculating slope: \(m = \frac{\text{rise}}{\text{run}}\)

21. \((-3, 4) (2, 8)\)
   \(m = \frac{8 - 4}{2 - (-3)} = \frac{4}{5}\)

22. \((2, 0) (-4, -8)\)
   \(m = \frac{-8 - 0}{-4 - 2} = \frac{-8}{-6} = \frac{4}{3}\)

23. Find the slope of each segment:
   \(AB = \frac{12}{3} = 4\)
   \(BC = \frac{8}{-8} = -1\)
   \(DC = \frac{12}{-6} = -2\)
   \(AD = 0\)
Are the lines parallel, perpendicular, or neither? Why?

31. \(y = 2x - 5, y = 2x + 5\)
   - **parallel**
   - same slope
   - diff. y-int.

32. \(Y = -\frac{1}{3}x + 4, y = 3x + 4\)
   - perpendicular
   - slopes are reciprocals

33. \(\frac{2}{3}x + 9, y = \frac{2}{3}x - 2\)
   - neither
   - slopes are reciprocals but not opposites

34. \(2x - y = 6, -4x + 2y = -12\)
   \(\Rightarrow \frac{y}{2} = \frac{x + 6}{4}\)
   \(\Rightarrow \frac{2y}{4} = x + 6\)
   \(\Rightarrow y = 2x + 6\)
   - neither
   - y-int.

35. \(6y = 4x + 18, 3x + 2y = -2\)
   \(\Rightarrow \frac{y}{2} = \frac{2x + 9}{6}\)
   \(\Rightarrow \frac{2y}{6} = x + 3\)
   \(\Rightarrow y = \frac{1}{3}x + 3\)
   - perpendicular
   - slopes are reciprocals

36. \(3y = 3x - 2\)
   \(\Rightarrow y = \frac{1}{3}x - \frac{2}{3}\)
   - parallel
   - same slope
   - diff. y-int.

Write an equation in slope-intercept form for the line PARALLEL to the given line through the point.

38. \(y = \frac{2}{3}x + 8\) (-15, 20)
   - \(m = \frac{2}{3}\)
   - \(y - 20 = \frac{2}{3}(x + 15)\)
   - \(y = \frac{2}{3}x + 30\)

39. \(5x - 4y = 40\) (24, -5)
   \(\Rightarrow -4y = -5x + 40\)
   \(\Rightarrow y = \frac{5}{4}x - 10\)
   - \(m = \frac{5}{4}\)
   - \(y = \frac{5}{4}x - 35\)

Write an equation in slope-intercept form for the line PERPENDICULAR to the given line through the point.

41. \(y = -2x + 10\) (20, 24)
   \(\Rightarrow -2 = \frac{y - 24}{x - 20}\)
   \(\Rightarrow x = \frac{1}{2}y + 14\)
   \(\Rightarrow m = -2\)

42. \(3x + 9y = 18\) (-2, 5)
   \(\Rightarrow 3y = -3x + 2\)
   \(\Rightarrow y = -x + \frac{2}{3}\)
   \(\Rightarrow m = -\frac{1}{3}\)

43. \(4x - 3y = -24\) (9, 12)
   \(\Rightarrow -3y = -4x - 24\)
   \(\Rightarrow y = \frac{4}{3}x + 8\)
   \(\Rightarrow m = \frac{4}{3}\)

\[y = \frac{3x + 11}{4}\]
\[y = -\frac{3x + 75}{4}\]