

3.10 – Applications of Linear Equations

Examples:

Scenario	Write a linear equation (Slope-Intercept Form or Standard Form)	Graph it (Label the y-intercept, the slope, and the axes)
<p>Georgia is going to join a local gym. She has to <u>pay a \$25 membership fee</u> and then <u>\$15 each month.</u></p> <p>a) Use your graph to find a solution. Label it on the graph and write it as a sentence. <i>For the graph, you only need Quadrant I.</i> (3,70) what does this mean? <u>After 3 months the total cost is \$70.</u></p> <p>b) How much will Georgia have to pay if she used the gym for <u>5 months</u>? <i>Plug into "x".</i> $y = 15(5) + 25 \rightarrow y = 100$</p>	<p>Membership fee \$25 (one time fee)</p> <p>Monthly fee \$15 per month</p> <p>$y = mx + b$</p> <p>$m = \frac{\\$15}{1 \text{ month}}$ $b = \\$25$ <i>ROC →</i></p> <p>$y = \text{Total cost of membership}$ $x = \# \text{ of months}$</p> <p><u>$y = 15x + 25$</u> <i>monthly fee</i></p> <hr/> <p><u>After 5 months the total cost will be \$100.</u></p>	<p>The graph shows a line on a coordinate plane. The y-axis is labeled 'Total Cost of Membership (\$)' and ranges from 0 to 90. The x-axis is labeled '# of Months' and ranges from 0 to 14. The line starts at the y-intercept (0, 25) and passes through points (1, 40), (2, 55), (3, 70), and (4, 85). The slope is positive, indicating an increasing cost over time.</p>
<p>Edwin has <u>\$100 in his bank.</u> He <u>starts spending \$2.50 each week</u> to buy snacks at lunch.</p> <p>a) Use your graph to find a solution. Label it on the graph and write it as a sentence. (16, 60) <u>After 16 week the account balance \$60.</u></p> <p>b) After how many weeks will Edwin run out of money? How is it shown on the graph? <i>Find the x-intercept;</i> let $y = 0$. $0 = -2.5x + 100$ $\frac{-2.5x}{-2.5} = \frac{100}{-2.5}$ $x = 40$</p>	<p>Starting Balance \$100</p> <p>Weekly <u>deduction.</u> \$2.50 per week</p> <p>$y = mx + b$</p> <p>$m = \frac{-2.50}{1 \text{ week}}$ $b = \\$100$ <i>ROC →</i></p> <p>$y = \text{Account Balance (\\$)}$ $x = \# \text{ of weeks}$</p> <p>$y = 100 - 2.5x$ or <u>$y = -2.5x + 100$</u></p> <hr/> <p><u>After 40 weeks his balance will be \$0.</u></p>	<p>The graph shows a line on a coordinate plane. The y-axis is labeled 'Account Balance (\$)' and ranges from 0 to 100. The x-axis is labeled '# of weeks' and ranges from 0 to 28. The line starts at the y-intercept (0, 100) and passes through points (4, 90), (8, 80), (12, 70), (16, 60), (20, 50), (24, 40), and (28, 30). The slope is negative, indicating a decreasing balance over time.</p>

Scenario	Write a linear equation (Slope-Intercept Form or Standard Form)	Graph it (Label the y-intercept, the slope, and the axes)
<p>John wants to start saving for college. His parents started an <u>account for him that currently holds \$325.</u> <u>John adds \$50 each month.</u></p> <p>3) a) Use your graph to find a solution. Label it on the graph and write it as a sentence. (10, 825) <u>After 10 months his account balance is \$825.</u></p> <p>b) Determine how much money John will have if he continues to save for a year? $y = 50x + 325$ $y = 50(12) + 325$ $y = 925$</p>	<p>Starting Balance \$325</p> <p>Deposits Each Month \$50</p> <p>$y = mx + b$</p> <p>$m = \frac{\\$50}{1 \text{ month}} \quad b = 325$</p> <p>$y =$ Account Balance</p> <p>$x =$ # of months</p> <p><u>$y = 50x + 325$</u></p> <p><u>After 1 year he has \$925.</u></p>	
<p>Tatyana moved into a new apartment and called to have cable installed. The cable company charged her <u>\$45 to install the cable</u> and <u>\$60 each month for service.</u></p> <p>4) a) Use your graph to find a solution. Label it on the graph and write it as a sentence. (4, 285) <i>What does this mean?</i> <u>At 4 months the total cost is \$285.</u></p> <p>b) Why should you only draw this graph in the first quadrant? <u>The quantities of, months and cost of cable \$, cannot be negative. Cannot have a negative x for months.</u></p>	<p>Just to install \$45</p> <p>Monthly Service \$60</p> <p>$y = mx + b$</p> <p>$m = \frac{\\$60}{1 \text{ month}} \quad b = \\45</p> <p>$y =$ Total cost of Cable over time.</p> <p>$x =$ # of months</p> <p><u>$y = 60x + 45$</u></p>	