

Standard Form of a Linear Equation

Name: _____ Date: _____ Score: _____ / 26

Q Quick Review

Standard form: $Ax + By = C$, where A, B, C are integers (usually with $A > 0$). It's the form most useful for finding intercepts and for problems where x and y are both "mixed in" (like "2 apples and 3 bananas cost \$7"). **To find the x -intercept:** set $y = 0$ and solve. **To find the y -intercept:** set $x = 0$ and solve. To convert from slope-intercept to standard form: move the x -term to the left side, clear any fractions, and make A positive. To convert standard form to slope-intercept: solve for y . Both forms describe the same line; choose whichever's easier for the task.

PRACTICE

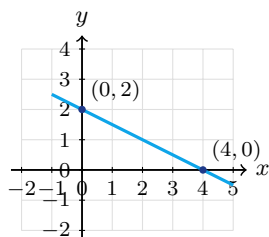
Find intercepts, convert forms, or write in standard form.

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| 1. $2x + 3y = 12$; x -int _____ | 11. $6x - 3y = 18$; slope _____ |
| 2. $2x + 3y = 12$; y -int _____ | 12. $2x + y = 0$; slope-intercept form _____ |
| 3. $x - y = 5$; x -int _____ | 13. Convert $y = \frac{3}{4}x - 2$ _____ |
| 4. $x - y = 5$; y -int _____ | 14. $x + y = 7$; slope _____ |
| 5. $5x + 2y = 10$; slope-intercept form _____ | 15. $x = 4$; intercepts _____ |
| 6. Convert $y = 2x - 3$ _____ | 16. $y = -2$; intercepts _____ |
| 7. Convert $y = -\frac{1}{2}x + 4$ _____ | 17. $7x - 2y = 14$; x -int _____ |
| 8. $3x - y = 9$; slope-intercept form _____ | 18. $7x - 2y = 14$; y -int _____ |
| 9. $4x + 5y = 20$; x -int _____ | 19. Through $(2, 0), (0, 3)$ in std form _____ |
| 10. $4x + 5y = 20$; y -int _____ | 20. Convert $2y - 6 = 4x$ _____ |

◆ VISUAL PRACTICE

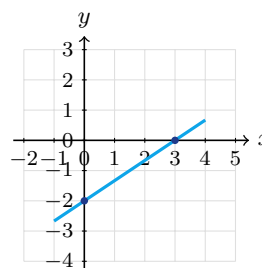
Use the graph, table, chart, or diagram to answer the question.

21. The line has intercepts $(4, 0)$ and $(0, 2)$. Write its equation in standard form.



Answer: _____

22. The line has intercepts $(3, 0)$ and $(0, -2)$. Write its equation in standard form.



Answer: _____



◆ Word Problems

23. Apples cost \$2 each and bananas \$1 each. You spent \$10. Write the equation in standard form, then find how many apples if you bought 4 bananas.

Model: _____

Answer: _____

24. A worker earns \$15 per hour at job A and \$20 per hour at job B. They earned \$240 total. Write the equation and find one possible combination.

Model: _____

Answer: _____

25. A line has an x -intercept of 5 and a y -intercept of -2 . Use the intercepts to write the equation in standard form.

Model: _____

Answer: _____

26. A car wash sells regular for \$8 and deluxe for \$15. They made \$300 one day. Write the equation.

Model: _____

Answer: _____



Answer Keys

- | | |
|--|---|
| <p>1. 6</p> <p>2. 4</p> <p>3. 5</p> <p>4. -5</p> <p>5. $y = -\frac{5}{2}x + 5$</p> <p>6. $2x - y = 3$</p> <p>7. $x + 2y = 8$</p> <p>8. $y = 3x - 9$</p> <p>9. 5</p> <p>10. 4</p> <p>11. 2</p> <p>12. $y = -2x$</p> <p>13. $3x - 4y = 8$</p> | <p>14. -1</p> <p>15. $x\text{-int } 4, \text{ no } y\text{-int}$</p> <p>16. $y\text{-int } -2, \text{ no } x\text{-int}$</p> <p>17. 2</p> <p>18. -7</p> <p>19. $3x + 2y = 6$</p> <p>20. $4x - 2y = -6 \text{ or } 2x - y = -3$</p> <p>21. $x + 2y = 4$</p> <p>22. $2x - 3y = 6$</p> <p>23. $2a + b = 10; a = 3$</p> <p>24. $15a + 20b = 240; \text{ e.g. } a = 8, b = 6$</p> <p>25. $2x - 5y = 10$</p> <p>26. $8r + 15d = 300$</p> |
|--|---|

Step-by-Step Tutor Notes

1. For a table question, slow down and locate the exact row, column, or cell before calculating. $y = 0 \Rightarrow 2x = 12 \Rightarrow x = 6$. This gives 6.
2. Use the labels on the display first; they tell you which count or total belongs in the answer. $x = 0 \Rightarrow 3y = 12 \Rightarrow y = 4$. This gives 4.
3. Use the labels on the display first; they tell you which count or total belongs in the answer. $y = 0 \Rightarrow x = 5$. This gives 5.
4. Read the table by matching the correct row and column first, then use the count or total that fits the question. $x = 0 \Rightarrow -y = 5 \Rightarrow y = -5$. This gives -5 .
5. For a table question, slow down and locate the exact row, column, or cell before calculating. $2y = -5x + 10 \Rightarrow y = -\frac{5}{2}x + 5$. This gives $y = -\frac{5}{2}x + 5$.
6. Move carefully through the arithmetic; one clean operation usually unlocks the next one. Subtract y : $0 = 2x - y - 3$. Add 3: $2x - y = 3$. After simplifying, the answer is $2x - y = 3$.
7. Move carefully through the arithmetic; one clean operation usually unlocks the next one. Multiply by 2: $2y = -x + 8$. Add x : $x + 2y = 8$. After simplifying, the answer is $x + 2y = 8$.
8. Work one inverse operation at a time and keep both sides balanced. Subtract $3x$: $-y = -3x + 9$. Multiply by -1 : $y = 3x - 9$. After simplifying, the answer is $y = 3x - 9$.
9. Read the table by matching the correct row and column first, then use the count or total that fits the question. $y = 0 \Rightarrow 4x = 20$. This gives 5.
10. Read the table by matching the correct row and column first, then use the count or total that fits the question. $x = 0 \Rightarrow 5y = 20$. This gives 4.
11. Use the labels on the display first; they tell you which count or total belongs in the answer. $-3y = -6x + 18 \Rightarrow y = 2x - 6$. Slope = 2. This gives 2.
12. Use the clue in the question first, then let the arithmetic finish the job. $y = -2x$. Through origin. So the answer is $y = -2x$.
13. Move carefully through the arithmetic; one clean operation usually unlocks the next one. Multiply by 4: $4y = 3x - 8$. Rearrange: $3x - 4y = 8$. After simplifying, the answer is $3x - 4y = 8$.
14. Compare the change in output to the change in input, because slope is a rate of change. $y = -x + 7$. Slope = -1 . So the requested value is -1 .
15. Focus on the main idea of the problem, then simplify carefully. Vertical line. Crosses x -axis at 4, never the y -axis. So the answer is $x\text{-int } 4, \text{ no } y\text{-int}$.
16. Start with the definition the problem is testing, then apply it directly. Horizontal line. Crosses y -axis at -2 , parallel to x -axis. So the answer is $y\text{-int } -2, \text{ no } x\text{-int}$.
17. Read the table by matching the correct row and column first, then use the count or total that fits the question. $y = 0 \Rightarrow 7x = 14$. This gives 2.
18. Read the table by matching the correct row and column first, then use the count or total that fits the question. $x = 0 \Rightarrow -2y = 14 \Rightarrow y = -7$. This gives -7 .
19. $y\text{-int } 3, x\text{-int } 2$. Slope-int: $y = -\frac{3}{2}x + 3$. Standard: $3x + 2y = 6$.
20. Move $4x$ left: $-4x + 2y = 6$. Multiply by -1 : $4x - 2y = -6$. Or divide by 2: $2x - y = -3$.
21. Using intercept form, $\frac{x}{4} + \frac{y}{2} = 1$. Multiply by 4 to get $x + 2y = 4$.
22. The intercept form is $\frac{x}{3} + \frac{y}{-2} = 1$. Multiplying by 6 gives $2x - 3y = 6$.
23. Use the labels on the display first; they tell you which count or total belongs in the answer. $2a + b = 10$. With $b = 4$: $2a + 4 = 10 \Rightarrow 2a = 6 \Rightarrow a = 3$ apples. This gives $2a + b = 10; a = 3$.
24. $15a + 20b = 240$. One solution: $a = 8, b = 6$: $15(8) + 20(6) = 120 + 120 = 240$. \checkmark .
25. Points $(5, 0)$ and $(0, -2)$. Slope: $\frac{-2-0}{0-5} = \frac{2}{5}$. $y = \frac{2}{5}x - 2$. Multiply by 5: $5y = 2x - 10$. Rearrange: $2x - 5y = 10$.
26. r regulars and d deluxes contribute $8r$ and $15d$ dollars: $8r + 15d = 300$. Many integer solutions exist; this is the constraint.



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