# Standard Form of a Linear Equation

| Name: _____ | Date: _____ | Score: _____ / 26 |
|---|---|---|

## 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

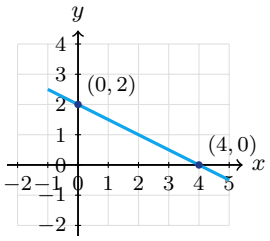
*Find intercepts, convert forms, or write in standard form.*

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

## VISUAL PRACTICE

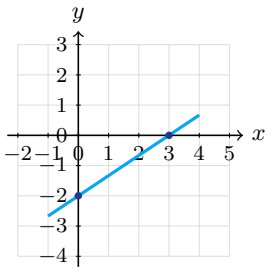
*Use the graph, table, chart, or diagram to answer the question.*

**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:** _____

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## 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

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

## 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 $x$-int $4$, no $y$-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 $y$-int $-2$, no $x$-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. $y$-int $3$, $x$-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: $a = 8, b = 6$: $15(8) + 20(6) = 120 + 120 = 240$. ✓.
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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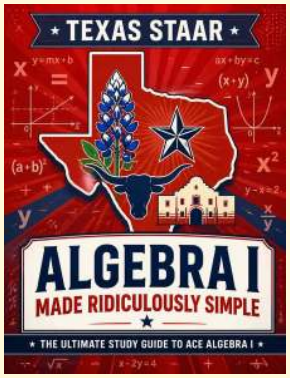


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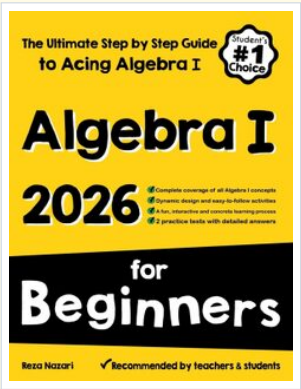


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