Standard Form of a Linear Equation

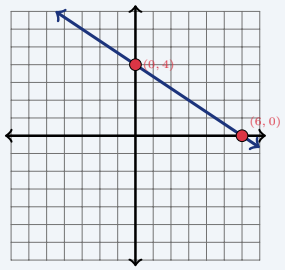
Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

Standard form is $Ax + By = C$ with integer coefficients. To find the x-*intercept*, set $y = 0$ and solve; for the y-*intercept*, set $x = 0$ and solve. You can switch to slope-intercept form by solving the equation for y.

▷ **Example:** Find the intercepts of $2x + 3y = 12$. **Work:** x-intercept: set $y = 0$, $2x = 12$, $x = 6 \to (6, 0)$. y-intercept: set $x = 0$, $3y = 12$, $y = 4 \to (0, 4)$.

★ **Answer:** $(6, 0)$ and $(0, 4)$



Set $y=0$ and $x=0$ for intercepts.

Practice Problems

Find the intercept, convert form, or write standard form as directed.

1. x-int of $x + y = 5$ _____
2. y-int of $x + y = 5$ _____
3. x-int of $2x + y = 8$ _____
4. y-int of $2x + y = 8$ _____
5. x-int of $3x - y = 9$ _____
6. y-int of $3x - y = 9$ _____
7. x-int of $x - 2y = 6$ _____
8. y-int of $x - 2y = 6$ _____
9. Solve for y: $2x + y = 7$ _____
10. Solve for y: $x + 3y = 9$ _____
11. Solve for y: $4x - 2y = 8$ _____
12. Solve for y: $-x + y = 2$ _____
13. Standard form of $y = 2x + 5$ _____
14. Standard form of $y = -3x + 1$ _____

Word Problems

15. The line $4x+2y = 20$ models a budget. Find its x-intercept. _____
16. A concession budget is modeled by $4x + 2y = 20$, where y is the dollars left after buying x snack packs. What is the y-intercept? _____
17. Convert $6x + 3y = 12$ to slope-intercept form. _____
18. A fundraiser goal is modeled by $x + y = 7$, where x and y are two types of ticket bundles. Find both intercepts to graph the plan. _____

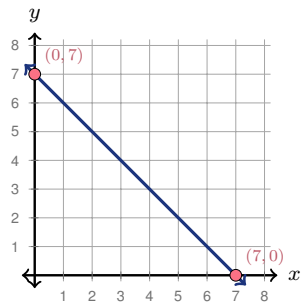
Answer Keys

1. $(5, 0)$	**7.** $(6, 0)$	**13.** $2x - y = -5$
2. $(0, 5)$	**8.** $(0, -3)$	**14.** $3x + y = 1$
3. $(4, 0)$	**9.** $y = -2x + 7$	**15.** $(5, 0)$
4. $(0, 8)$	**10.** $y = -\frac{1}{3}x + 3$	**16.** $(0, 10)$
5. $(3, 0)$	**11.** $y = 2x - 4$	**17.** $y = -2x + 4$
6. $(0, -9)$	**12.** $y = x + 2$	**18.** $(7, 0)$ and $(0, 7)$

Graph Answer Sketch

The word problem in item 18 asks for intercepts so the plan can be graphed. The sketch below shows those intercepts on the line.

18. For $x + y = 7$, the intercepts are $(7, 0)$ and $(0, 7)$. Plot both points, then draw the line through them.



Step-by-Step Explanations

1. Start by naming the process: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $y = 0$: $x = 5$, giving $(5, 0)$. So the final answer is $(5, 0)$.

2. A good way to think about this is: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $x = 0$: $y = 5$, giving $(0, 5)$. So the final answer is $(0, 5)$.

3. Step by step: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $y = 0$: $2x = 8$, $x = 4$, giving $(4, 0)$. So the final answer is $(4, 0)$.

4. Take it one move at a time: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $x = 0$: $y = 8$, giving $(0, 8)$. So the final answer is $(0, 8)$.

5. Start by naming the process: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $y = 0$: $3x = 9$, $x = 3$, giving $(3, 0)$. So the final answer is $(3, 0)$.

6. A good way to think about this is: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $x = 0$: $-y = 9$, $y = -9$, giving $(0, -9)$. So the final answer is $(0, -9)$.

7. Step by step: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $y = 0$: $x = 6$, giving $(6, 0)$. So the final answer is $(6, 0)$.

8. Take it one move at a time: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $x = 0$: $-2y = 6$, $y = -3$, giving $(0, -3)$. So the final answer is $(0, -3)$.

9. Start by naming the process: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Subtract $2x$: $y = -2x + 7$. So the final answer is $y = -2x + 7$.

10. A good way to think about this is: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Subtract x: $3y = -x + 9$. Divide by 3: $y = -\frac{1}{3}x + 3$. So the final answer is $y = -\frac{1}{3}x + 3$.

11. Step by step: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Subtract $4x$: $-2y = -4x + 8$. Divide by -2: $y = 2x - 4$. So the final answer is $y = 2x - 4$.

12. Take it one move at a time: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Add x to both sides: $y = x + 2$. So the final answer is $y = x + 2$.

13. Start by naming the process: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Move $2x$ left: $-2x + y = 5$. Multiply by -1: $2x - y = -5$. So the final answer is $2x - y = -5$.

14. A good way to think about this is: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Move $-3x$ left: $3x + y = 1$. So the final answer is $3x + y = 1$.

15. Step by step: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $y = 0$: $4x = 20$, $x = 5$, giving $(5, 0)$. So the final answer is $(5, 0)$.

16. Take it one move at a time: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $x = 0$: $2y = 20$, $y = 10$, giving $(0, 10)$. So the final answer is $(0, 10)$.

17. Start by naming the process: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Subtract $6x$: $3y = -6x + 12$. Divide by 3: $y = -2x + 4$. So the final answer is $y = -2x + 4$.

18. A good way to think about this is: To find an intercept, set the other variable equal to zero and solve the remaining equation. The setup/work is Set $y = 0 \rightarrow (7, 0)$ and $x = 0 \rightarrow (0, 7)$. So the final answer is $(7, 0)$ and $(0, 7)$.

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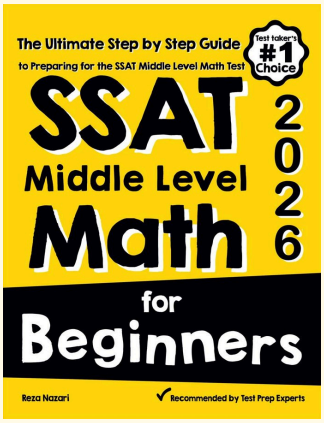

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