

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 $y = 0$, $2x = 12$, $x = 6 \rightarrow (6, 0)$. y -intercept: set $x = 0$, $3y = 12$, $y = 4 \rightarrow (0, 4)$.
 ★ **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 $x + y = 5$ | _____ | 8. y -int of $x - 2y = 6$ | _____ |
| 2. y -int of $x + y = 5$ | _____ | 9. Solve for y : $2x + y = 7$ | _____ |
| 3. x -int of $2x + y = 8$ | _____ | 10. Solve for y : $x + 3y = 9$ | _____ |
| 4. y -int of $2x + y = 8$ | _____ | 11. Solve for y : $4x - 2y = 8$ | _____ |
| 5. x -int of $3x - y = 9$ | _____ | 12. Solve for y : $-x + y = 2$ | _____ |
| 6. y -int of $3x - y = 9$ | _____ | 13. Standard form of $y = 2x + 5$ | _____ |
| 7. x -int of $x - 2y = 6$ | _____ | 14. Standard form of $y = -3x + 1$ | _____ |

◆ Word Problems

- | | | | |
|--|-------|--|-------|
| 15. The line $4x + 2y = 20$ models a budget. Find its x -intercept. | _____ | 17. Convert $6x + 3y = 12$ to slope-intercept form. | _____ |
| 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? | _____ | 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. | _____ |



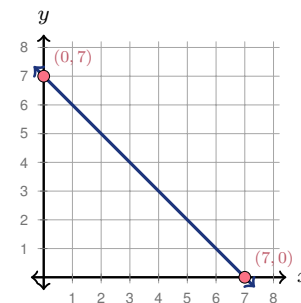
Answer Keys

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

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.



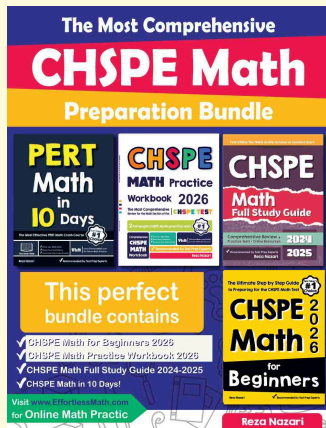
Step-by-Step Explanations

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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