**1. Solve this system of linear equations by graphing.**

**y = -1/5 x**

**y = -x – 4**

1. *Please re-read the question carefully*
2. *(Summary) This is a straightforward linear systems problem that asks you to find the solution to the system by graphing.*
3. *(Meta-Scaffolding) What does a solution to a system of linear equations mean?*
4. *(Scaffolding) A solution to a system of linear equations means that there is an X,Y point that makes both of the equations true. On a graph, that is the point where they intersect.*
5. *(Meta-Scaffolding) What form are the above lines in?*
6. *(Scaffolding) They are in slope-intercept form. This means they are in the form y = mx + b*
7. *(Meta-Scaffolding) Graph the first equation.*
8. *(Meta-Scaffolding) What is the slope of the first equation?*
9. *(Scaffolding) m = -⅕ , so we know that the slope of the first equation is -⅕*
10. *(Meta-Scaffolding) What is the y-intercept of the equation?*
11. *(Scaffolding) b = 0, so the y-intercept is (0,0)*
12. *(Meta-Scaffolding) Graph the second equation*
13. *(Meta-Scaffolding) What is the slope of the first equation?*
14. *(Scaffolding) m= -1, so we know that the slope of the first equation is -1*
15. *(Meta-Scaffolding) What is the y-intercept of the equation?*
16. *(Scaffolding) b = -4, so the y-intercept is (0,-4)*
17. *(Meta-Scaffolding) Once both equations are graphed, how can we find the solution to this system?*
18. *(Scaffolding) The solution to this system is the point in the graph where these two lines intersect.*
19. *(Scaffolding) So the solution is (-5, 1)*

**2. Is (3, 1) a solution to the linear system?**

**2x + 9y = 15**

**19x + y = 1**

1. *Please re-read the question carefully*
2. *(Summary) This is a backwards reasoning linear systems problem that gives you a possible solution to the system and needs you to determine if it is indeed the solution*
3. *(Meta-Scaffolding) What does a solution to a system of linear equations mean?*
4. *(Scaffolding) A solution to a system of linear equations means that there is an X,Y point that makes both of the equations true. On a graph, that is the point where they intersect.*
5. *(Meta-Scaffolding) Since we are given a possible solution, how can we check to see if it is an actual solution to the system?*
6. *(Scaffolding) We can plug in the given values for x and y to determine if they make both equations true.*
7. *(Meta-Scaffolding) Check the first equation*
8. *(Meta-Scaffolding) How can you plug (3,1) into the first equation to check if it’s true?*
9. *(Scaffolding) 2(3) + 9(1) = 15*
10. *(Meta-Scaffolding) Simplify this equation.*
11. *(Scaffolding) You get 15 = 15*
12. *(Meta-Scaffolding) What does this mean?*
13. *(Scaffolding) Since both sides are equal, (3,1) is a solution to the first equation.*
14. *(Meta-Scaffolding) Check the second equation*
15. *(Meta-Scaffolding) How can you plug (3,1) into the second equation to check if it’s true?*
16. *(Scaffolding) 19(3) + (1) = 1*
17. *(Meta-Scaffolding) Simplify this equation.*
18. *(Scaffolding) You get 58 = 1*
19. *(Meta-Scaffolding) What does this mean?*
20. *(Scaffolding) Since both sides are not equal, (3,1) is not a solution to the second equation.*
21. *(Meta-Scaffolding) What does this mean?*
22. *(Scaffolding) Since (3,1) is not a solution to both equations, is is not a solution to the system of equations*
23. *(Scaffolding) Therefore your answer is “No”*

**3. Use the Method of Substitution to solve this linear system.**

**x – 7y = -11**

**5x + 2y = -18**

1. *Please re-read the question carefully.*
2. *(Summary) This problem is a straight-forward math problem that is asking you to use your knowledge of the method of substitution to find the solution.*
3. *(Meta Scaffolding) What does the solution to a system of linear equations mean?*
4. *(Scaffolding) A solution to the linear system is found when you have values of x and y that make both of the equations true.*
5. *(Scaffolding) You need to find the point (values of x and y) that make both of the equations true.*
6. *(Meta Scaffolding) What is the substitution method?*
7. *(Scaffolding) The substitution method is when you solve for one variable in one of the equations and substitute in the answer you got for that variable into the other equation.*
8. *(Meta Scaffolding) Which variable should we solve for first?*
9. *(Scaffolding) Let’s solve for x in the first equation*
10. *(Meta Scaffolding) How can we solve for x?*
11. *(Scaffolding) Move everything but x to the other side of the equation.*
12. *(Scaffolding) So* x – 7y = -11 *becomes x = -11 + 7y*
13. *(Meta Scaffolding) How can we substitute this value into the second equation?*
14. *(Scaffolding) The second equation becomes* 5( *-11 + 7y*) + 2y = -18
15. *(Meta Scaffolding) How can we simplify this equation to get a solution for y?*
16. *(Scaffolding) Combine like terms.*
17. *(Scaffolding) So it becomes: -55 + 35y +2y = -8, which means that y = 1*
18. *(Meta Scaffolding) Now that we have y, how can we use this information to obtain a value for x?*
19. *(Scaffolding) We can substitute in 1 for y in the first equation and solve for x*
20. *(Scaffolding) So the first equation becomes* x – 7(1) = -11
21. *(Scaffolding) Simplify to get x = -4*
22. *(Meta Scaffolding) Now that you have both x and y, what is your final answer?*
23. *(Scaffolding) Your answer is (-4, 1)*

**4. Use the Method of Elimination to solve this linear system.**

**6x — 5y = 8**

**-12x + 2y = 0**

1. *Please re-read the question carefully*
2. *(Summary) This is a straightforward linear system problem that wants you to use the method of elimination to find a solution to the linear system.*
3. *(Meta-Scaffolding) What does a solution to a system of linear equations mean?*
4. *(Scaffolding) A solution to a system of linear equations means that there is an X,Y point that makes both of the equations true. On a graph, that is the point where they intersect.*
5. *(Meta-Scaffolding) What is the elimination method?*
6. *(Scaffolding) The elimination method is when you can add the two equations together to cancel out one of the variables.*
7. *(Meta-Scaffolding) Which variable would be the easiest to cancel out?*
8. *(Scaffolding) In this case, we want to cancel out the x value because its coefficients are multiples of each other*
9. *(Meta-Scaffolding) How can we eliminate the x variable?*
10. *(Scaffolding) To eliminate the x variable, the coefficients must be inverses.*
11. *(Scaffolding) You can multiply the first equation by 2 to make the x coefficient 12, which is the inverse of -12.*
12. *(Meta-Scaffolding) You cannot just multiply the 6 by 2, you must multiply the entire equation by 2*
13. *(Meta-Scaffolding) Once we multiple the first equation, what does it look like*
14. *(Scaffolding) You get 12x – 10y = 16.*
15. *(Meta-Scaffolding) Now you should add the two equations together.*
16. *(Scaffolding) Add the like terms of the equation. -10y + 2y = -8y. and 16+0=16*
17. *(Meta-Scaffolding) Simplify the equation to solve for y*
18. *(Scaffolding) Now we have y = -2.*
19. *(Meta-Scaffolding) Plug this value back into either equation to solve for x.*
20. *(Scaffolding) We get x = -⅓*
21. *(Meta-Scaffolding) Now that we have both x and y, how can we put this information together to write the solution?*
22. *(Scaffolding) The solution is (-⅓ , -2)*

**5. Is (1, 9) a solution to this system of equations?**

**y = 8x + 1**

**y = x + 8**

1. *Please re-read the question carefully*
2. *(Summary) This is a backwards reasoning linear systems problem that gives you a possible solution to the system and needs you to determine if it is indeed the solution*
3. *(Meta-Scaffolding) What does a solution to a system of linear equations mean?*
4. *(Scaffolding) A solution to a system of linear equations means that there is an X,Y point that makes both of the equations true. On a graph, that is the point where they intersect.*
5. *(Meta-Scaffolding) Since we are given a possible solution, how can we check to see if it is an actual solution to the system?*
6. *(Scaffolding) We can plug in the given values for x and y to determine if they make both equations true.*
7. *(Meta-Scaffolding) Check the first equation*
8. *(Meta-Scaffolding) How can you plug (1,9) into the first equation to check if it’s true?*
9. *(Scaffolding) 9 = 8(1) + 1*
10. *(Meta-Scaffolding) Simplify this equation.*
11. *(Scaffolding) You get 9 = 9*
12. *(Meta-Scaffolding) What does this mean?*
13. *(Scaffolding) Since both sides are equal, (1,9) is a solution to the first equation.*
14. *(Meta-Scaffolding) Check the second equation*
15. *(Meta-Scaffolding) How can you plug (1,9) into the second equation to check if it’s true?*
16. *(Scaffolding) 9 = 1 + 8*
17. *(Meta-Scaffolding) Simplify this equation.*
18. *(Scaffolding) You get 9 = 9*
19. *(Meta-Scaffolding) What does this mean?*
20. *(Scaffolding) Since both sides are equal, (1,9) is a solution to the second equation.*
21. *(Meta-Scaffolding) What does this mean?*
22. *(Scaffolding) Since (1,9) is a solution to both equations, it is a solution to the system*
23. *(Scaffolding) Therefore your answer is “Yes”*

**6. Solve this system of linear equations by graphing.**

**y = x — 2**

**y = 2x**

1. *Please re-read the question carefully*
2. *(Summary) This is a straightforward linear systems problem that asks you to find the solution to the system by graphing.*
3. *(Meta-Scaffolding) What does a solution to a system of linear equations mean?*
4. *(Scaffolding) A solution to a system of linear equations means that there is an X,Y point that makes both of the equations true. On a graph, that is the point where they intersect.*
5. *(Meta-Scaffolding) What form are the above lines in?*
6. *(Scaffolding) They are in slope-intercept form. This means they are in the form y = mx + b*
7. *(Meta-Scaffolding) Graph the first equation.*
8. *(Meta-Scaffolding) What is the slope of the first equation?*
9. *(Scaffolding) m = 1 , so we know that the slope of the first equation is 1*
10. *(Meta-Scaffolding) What is the y-intercept of the equation?*
11. *(Scaffolding) b = -2, so the y-intercept is (0,-2)*
12. *(Meta-Scaffolding) Graph the second equation*
13. *(Meta-Scaffolding) What is the slope of the first equation?*
14. *(Scaffolding) m= 2, so we know that the slope of the first equation is 2*
15. *(Meta-Scaffolding) What is the y-intercept of the equation?*
16. *(Scaffolding) b = 0, so the y-intercept is (0,0)*
17. *(Meta-Scaffolding) Once both equations are graphed, how can we find the solution to this system?*
18. *(Scaffolding) The solution to this system is the point in the graph where these two lines intersect.*
19. *(Scaffolding) So the solution is (-2, -4)*

**7. Use the Method of Substitution to solve this linear system.**

**8x + 2y = 18**

**x + 2y = -10**

1. *Please re-read the question carefully.*
2. *(Summary) This problem is a straight-forward math problem that is asking you to use your knowledge of the method of substitution to find the solution.*
3. *(Meta Scaffolding) What does the solution to a system of linear equations mean?*
4. *(Scaffolding) A solution to the linear system is found when you have values of x and y that make both of the equations true.*
5. *(Scaffolding) You need to find the point (values of x and y) that make both of the equations true.*
6. *(Meta Scaffolding) What is the substitution method?*
7. *(Scaffolding) The substitution method is when you solve for one variable in one of the equations and substitute in the answer you got for that variable into the other equation.*
8. *(Meta Scaffolding) Which variable should we solve for first?*
9. *(Scaffolding) Let’s solve for x in the second equation*
10. *(Meta Scaffolding) How can we solve for x?*
11. *(Scaffolding) Move everything but x to the other side of the equation.*
12. *(Scaffolding) So x + 2y = -10 becomes x = -10 - 2y*
13. *(Meta Scaffolding) How can we substitute this value in?*
14. *(Scaffolding) The first equation becomes 8 (-10 - 2y) + 2y = 18*
15. *(Meta Scaffolding) How can we simplify this equation to get a solution for y?*
16. *(Scaffolding) Combine like terms.*
17. *(Scaffolding) So it becomes: -80 - 16y + 2y =18 which means that y = -7*
18. *(Meta Scaffolding) Now that we have y, how can we use this information to obtain a value for x?*
19. *(Scaffolding) We can substitute in -7 for y in the second equation and solve for x*
20. *(Scaffolding) So the first equation becomes x + 2 (-7) = -10*
21. *(Scaffolding) Simplify to get x = 4*
22. *(Meta Scaffolding) Now that you have both x and y, what is your final answer?*
23. *(Scaffolding) Your answer is (4, -7)*

**8. Use the Method of Elimination to solve this linear system.**

**8x – 6y = 12**

**-8x + 5y = 2**

1. *Please re-read the question carefully*
2. *(Summary) This is a straightforward linear system problem that wants you to use the method of elimination to find a solution to the linear system.*
3. *(Meta-Scaffolding) What does a solution to a system of linear equations mean?*
4. *(Scaffolding) A solution to a system of linear equations means that there is an X,Y point that makes both of the equations true. On a graph, that is the point where they intersect.*
5. *(Meta-Scaffolding) What is the elimination method?*
6. *(Scaffolding) The elimination method is when you can add the two equations together to cancel out one of the variables.*
7. *(Meta-Scaffolding) Which variable would be the easiest to cancel out?*
8. *(Scaffolding) In this case, we want to cancel out the x value because its coefficients are inverses of one another*
9. *(Meta-Scaffolding) How can we eliminate the x variable?*
10. *(Scaffolding) To eliminate the x variable, the coefficients must be inverses.*
11. *(Meta-Scaffolding) Since this is true, you just add the two equations together*
12. *(Scaffolding) Add the like terms of the equation. -6y + 5y = -y. and 12+2=14*
13. *(Meta-Scaffolding) Simplify the equation to solve for y*
14. *(Scaffolding) Now we have y = -14.*
15. *(Meta-Scaffolding) Plug this value back into either equation to solve for x.*
16. *(Scaffolding) We get x = 9*
17. *(Meta-Scaffolding) Now that we have both x and y, how can we put this information together to write the solution?*
18. *(Scaffolding) The solution is (9 , -14)*

**9. Kendrick wrote a business plan for an entrepreneurship class, and now he has to make bound copies. Kendrick could use a printer who charges a setup fee of $50 and $5 for every copy printed. Another possibility is to go to the office supply store, where he could pay an up-front fee of $30 and $7 per copy. There is a certain number of copies that makes the two options equivalent in terms of cost. How much would the copies cost?**

1. *Please re-read the question carefully.*
2. *(Summary) This is a complete word problem that asks you to use the techniques you know to solve linear systems in a real life example.*
3. *(Meta Scaffolding): What kind of problem is this?*
4. *(Scaffolding) This is a system of linear equations problem.*
5. *(Meta Scaffolding) How can you translate this written problem into a math problem?*
6. *(Scaffolding) The question gives you enough information to create a set of two linear equations.*
7. *(Meta Scaffolding) What are the variables in this problem?*
8. *(Scaffolding) For this problem, let’s use P for the total price and c for the number of copies.*
9. *(Meta Scaffolding) How could you turn the information about the printer into an equation?*
10. *(Scaffolding) “Setup fee of $50” means that the y intercept is 50*
11. *(Scaffolding) “$5 for every copy printed” means that the slope is 5*
12. *(Meta Scaffolding) You can combine these two pieces of information to create an equation for this relationship*
13. *(Scaffolding) So our first equation is P = 5c + 50*
14. *(Meta Scaffolding) How could you turn the information about the office supply store into an equation?*
15. *(Scaffolding) “Up-front fee of $30” means that the y intercept is 30*
16. *(Scaffolding) “$7 per copy” means that the slope is 7*
17. *(Meta Scaffolding) You can combine these two pieces of information to create an equation for this relationship*
18. *(Scaffolding) So our second equation is P = 7c + 30*
19. *(Meta Scaffolding) How can we use the techniques of solving linear equations to find the solution?*
20. *(Scaffolding) The easiest way to solve this problem is to graph the two equations and find their point of intersection.*
21. *(Meta Scaffolding) How should you arrange our two variables on an x-y coordinate plane?*
22. *(Scaffolding) You can use c for x and P for y*
23. *(Meta-Scaffolding) Graph the two equations*
24. *(Scaffolding) When you do that, you get an answer of (10, 100)*
25. *(Meta Scaffolding) What does this answer mean in the context of the problem?*
26. *(Scaffolding) It means that when you make 10 copies, it costs $100*
27. *(Meta Scaffolding) What is the problem asking for?*
28. *(Scaffolding) The problem just wants to know how much it will cost.*
29. *(Scaffolding) So the answer is $100*

**10. Two students in Mr. Montoya's class, Maggie and Jonah, have been assigned a workbook to complete at their own pace. They get together at Maggie's house after school to complete as many pages as they can. Maggie has already completed 94 pages and will continue working at an average pace of 1 page per hour. Jonah has only completed 88 pages, but can work at a rate of 4 pages per hour. Eventually, Jonah will catch up and the two will be working on the same page. How many pages will each of them have finished? How long will that take?**

1. *Please re-read the question carefully.*
2. *(Summary) This is a complete word problem that asks you to use the techniques you know to solve linear systems in a real life example.*
3. *(Meta Scaffolding): What kind of problem is this?*
4. *(Scaffolding) This is a system of linear equations problem.*
5. *(Meta Scaffolding) How can you translate this written problem into a math problem?*
6. *(Scaffolding) The question gives you enough information to create a set of two linear equations.*
7. *(Meta Scaffolding) What are the variables in this problem?*
8. *(Scaffolding) For this problem, let’s use P for the total pages and h for the number of hours*
9. *(Meta Scaffolding) How could you turn the information about Maggie’s progress into an equation?*
10. *(Scaffolding) “already completed 94 pages” means that the y intercept is 94*
11. *(Scaffolding) “average pace of 1 page per hour” means that the slope is 1*
12. *(Meta Scaffolding) You can combine these two pieces of information to create an equation for this relationship*
13. *(Scaffolding) So our first equation is P = h + 94*
14. *(Meta Scaffolding) How could you turn the information about Jonah’s progress into an equation?*
15. *(Scaffolding) “completed 88 pages” means that the y intercept is 88*
16. *(Scaffolding) “rate of 4 pages per hour” means that the slope is 4*
17. *(Meta Scaffolding) You can combine these two pieces of information to create an equation for this relationship*
18. *(Scaffolding) So our second equation is P = 4h + 88*
19. *(Meta Scaffolding) How can we use the techniques of solving linear equations to find the solution?*
20. *(Scaffolding) The easiest way to solve this problem is to graph the two equations and find their point of intersection.*
21. *(Meta Scaffolding) How should you arrange our two variables on an x-y coordinate plane?*
22. *(Scaffolding) You can use h for x and P for y*
23. *(Scaffolding) When you do that, you get an answer of (2, 96)*
24. *(Meta Scaffolding) What does this answer mean in the context of the problem?*
25. *(Scaffolding) It means that when they work for 2 hours, they will both have 96 pages done*
26. *(Meta Scaffolding) What is the problem asking for?*
27. *(Scaffolding) The problem wants to know how many pages they’ll have finished and how long it took for them to get there*
28. *(Scaffolding) So the answer is “They will have each finished 96 pages. It will take them 2 hours”*

**11. Georgetown City Cafe recently introduced a new flavor of coffee. They served 21 grande cups and 36 jumbo cups of the new coffee today, which equaled a total of 1,086 ounces. The day before, 21 grande cups and 31 jumbo cups were served, which used a total of 976 ounces. How much coffee is required to make each size?**

1. *Please re-read the question carefully.*
2. *(Summary) This is a complete word problem that asks you to use the techniques you know to solve linear systems in a real life example.*
3. *(Meta Scaffolding): What kind of problem is this?*
4. *(Scaffolding) This is a system of linear equations problem.*
5. *(Meta Scaffolding) How can you translate this written problem into a math problem?*
6. *(Scaffolding) The question gives you enough information to create a set of two linear equations.*
7. *(Meta Scaffolding) What are the variables in this problem?*
8. *(Scaffolding) For this problem, let’s use G for the number of ounces it takes to make a grande cup and J for the number of ounces it takes to make a jumbo cup*
9. *(Meta Scaffolding) How could you turn the information about today’s coffee served into an equation?*
10. *(Scaffolding) “21 grande cups” means that 21G*
11. *(Scaffolding) “36 jumbo cups” means that 36J*
12. *(Scaffolding) “equaled a total of 1,086” means that the sum of the two is 1086*
13. *(Meta Scaffolding) You can combine these pieces of information to create an equation for this relationship*
14. *(Scaffolding) So our first equation is 21G + 36J = 1086*
15. *(Meta Scaffolding) How could you turn the information about the day before’s coffee served into an equation?*
16. *(Scaffolding) “21 grande cups” means that 21G*
17. *(Scaffolding) “36 jumbo cups” means that 31J*
18. *(Scaffolding) “equaled a total of 976” means that the sum of the two is 976*
19. *(Meta Scaffolding) You can combine these pieces of information to create an equation for this relationship*
20. *(Scaffolding) So our second equation is 21G + 31J = 976*
21. *(Meta Scaffolding) How can we use the techniques of solving linear equations to find the solution?*
22. *(Scaffolding) The easiest way to solve this problem is to use the method of elimination*
23. *(Meta-Scaffolding) What is the elimination method?*
24. *(Scaffolding) The elimination method is when you can add the two equations together to cancel out one of the variables.*
25. *(Meta-Scaffolding) Which variable would be the easiest to cancel out?*
26. *(Scaffolding) In this case, we want to cancel out the G value because its coefficients are equivalent*
27. *(Meta-Scaffolding) How can we eliminate the x variable?*
28. *(Scaffolding) To eliminate the x variable, the coefficients must be inverses.*
29. *(Meta-Scaffolding) How can we make the coefficients inverses?*
30. *(Scaffolding) Multiply the second equation by negative one*
31. *(Meta-Scaffolding) Remember that you have to multiply the entire second equation by negative one*
32. *(Scaffolding) So you get -21G - 31J = -976*
33. *(Meta-Scaffolding) Add the two equations together to*
34. *(Scaffolding) Add the like terms of the equation. 36J + -31J = 5J. and 1086 +-976 = 110*
35. *(Meta-Scaffolding) Simplify the equation to solve for J*
36. *(Scaffolding) Now we have J = 22.*
37. *(Meta-Scaffolding) Plug this value back into either equation to solve for G.*
38. *(Scaffolding) We get G = 14*
39. *(Meta-Scaffolding) Now that we have both J and G, what does this mean in the context of the problem?*
40. *(Scaffolding) A grande sized cup of coffee takes 14 ounces of coffee beans to make and a jumbo sized cup of coffee takes 22 ounces of coffee beans to make*