**A1 Unit Exam – Solving Linear Equations and Inequalities**

Topics Covered

* Solve Linear Equations in One Variable
* Solve Linear Inequalities in One Variable
* Solve Systems of Linear Equations in Two Variables
* Create Systems of Linear Equations in Two Variables
* Graph Linear Inequalities in Two Variables
* Graphically Solve a System of Linear Inequalities in Two Variables

Standards

A.CED.1: Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, as well as simple rational and exponential functions.

* High Emphasis
* Ex. Which equation can be used to find...
* Ex. Which inequality can be used to determine...

A.CED.2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

* High Emphasis
* Ex. Which equation shows the relationship of the variables represented in the table/graph?
* Ex. Which graph represents the equation?

A.CED.3: Represent constraints by equations or inequalities and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

* High Emphasis
* Ex. Which system of equations represents….
* Ex. What does the solution (8, 25) represent in the context of the problem?
* Ex. Which graph represents the situation?

A.REI.1: Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

* High Emphasis
* Ex. Which statement explains why the equation in Step 3 is equivalent to Step 2?
* Ex. Which property was used to get from the equation in Step 1 to the equation in step 2?

A.REI.3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

* High Emphasis
* Ex. *y* = m*x* + b, solve for *x*.

A-REI.12: Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

* High Emphasis
* Ex. Which graph shows the solution of: y < 2x + 3
* Ex. Which graph shows the solution to the system of inequalities?

A.REI.6: Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

* Low Emphasis
* Ex. At which point do the two linear equations intersect?
* Ex. Which values of *x* and *y* satisfies both equations?
* Ex. Solve the system of equations.

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**Answer Key**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Correct** |  | **#** | **Correct** |  | **#** | **Correct** |  | **#** | **Correct** |  | **#** | **Correct** |  | **#** | **Correct** |
| 1 | B |  | 4 | D |  | 7 | D |  | 10 | A |  | 13 | C |  | 16 | D |
| 2 | B |  | 5 | 25 |  | 8 | 9 |  | 11 | B |  | 14 | A |  | 17 | A |
| 3 | D |  | 6 | A |  | 9 | 20 |  | 12 | C |  | 15 | B |  | 18 | D |

19. Rubric

 2-Points Examinee identifies 3 correct responses: C, E, and F.

 1-Point Examinee identifies 2 correct responses.

 0-Point Examinee identifies 1 or 0 correct response.

20. Rubric

 2-Points Examinee finds the correct ordered pair, , AND .

 1-Point Examinee finds only one of the correct ordered pair, , OR .

0-Point Examinee does not attempt item or the response is completely irrelevant or completely incorrect.

EXTRA CREDIT

21. D

22. C

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**A1 Unit Exam – Solving Linear Equations and Inequalities**

1. Consider the steps that a student wrote as he solved the equation: 6*x* + 9 = 33*.*

 Equation: 6*x* + 9 = 33

 Step 1: 6*x* = 24

 Solution: *x* = 4

Which statement explains why the solution following Step 1 is a valid step?

 A. If you add 9 to both sides of an equation, the sides remain equal.

 B. If you divide both sides of an equation by 6, the sides remain equal.

 C. If you multiply both sides of an equation by 6, the sides remain equal.

 D. If you subtract 9 from both sides of an equation, the sides remain equal.

2. Consider the steps that a mathematician writes as she solves the equation: 5*x* + 2 = 3*x* – 7.

 Equation: 5*x* + 2 = 3*x* – 7

 Step 1: 2*x* + 2 = –7

 Step 2: 2*x* = –9

 Solution: 

 Which statement explains why the solution following Step 2 is a valid step?

 A. If you add 2 to both sides of an equation, the sides remain equal.

 B. If you divide both sides of an equation by 2, the sides remain equal.

 C. If you multiply both sides of an equation by 2, the sides remain equal.

 D. If you subtract 2 from both sides of an equation, the sides remain equal.

3. Solve for: 

 A. 

 B. 

 C. 

 D. 

4. Solve for: 

 A. 

 B. 

 C. 

 D. 

|  |  |
| --- | --- |
| 5. Consider the equation below.   What is the value of *x* that will make the equation true? |  |

6. What is the value of *x* in the equation  ?

 A. 4

 B. 6

 C. 8

 D. 11

7. The equation 0.25*x* – 50 = 240 can be used to find the total height of a ramp, in meters, given the distance, *x*, in meters, from the beginning of the ramp.

What is the value of *x* in meters?

A. 290

B. 242

C. 760

D. 1160

|  |  |
| --- | --- |
| 8. The equation below can be used to predict *a,* the number of antibodies that should be present in a patient’s blood, *d* days after taking a particular medicine.   Using the given function, after how many days will it be predicted that the patient will have 640 antibodies in their blood? |  |

|  |  |
| --- | --- |
| 9. The equation *y* = 1.5*x* + 3.5 can be used to find *y*, the total cost of riding in a taxi in Tulsa, given *x*, the number of miles that were traveled in the taxi. How far did Damien travel in a taxi in Tulsa if he was charged $33.50? |  |

10. Find the solution: 

 A. 

 B. 

 C. 

 D. 

|  |  |
| --- | --- |
| 11. Solve for *x*,  -2*x* + 12 > 141. *x* > -1
2. *x* < -1
3. *x* < -2
4. *x* > 14
 |  |

12. Consider the system of equations.

 

 Which ordered pair is the solution to the system of equations?

 A. 

 B. 

 C. 

 D. 

13. Which ordered pair is the solution to the system of equations shown below?

|  |  |
| --- | --- |
|   | A. (−1, 2)B. (−1, −1)C. (2, −1)D. (−2, −1) |

14. Small boxes and large boxes are stacked together on a pallet.

* The total number of boxes is 10.
* The small boxes weigh 5 pounds each.
* The large boxes weigh 12 pounds each.
* The total weight of the boxes is 78 pounds.

 Which system of equations can be used to find the number of small boxes, , and large boxes, , on the pallet?

 A. 



 B. 

 

 C. 

 

 D. 

 

15. Justin, *J*, worked 5 hours longer this week than Andy, *A*. They worked a total of  hours. Which system of equations can be used to find how long each worked?

 A. 

 

 B. 

 

 C. 

 

 D. 

 

16. Which graph shows the solution of?

|  |  |  |  |
| --- | --- | --- | --- |
| A. |   | B. |   |
| C. |    | D. |    |

17. Given:  and 

Which graph shows the solution of the given set of inequalities?

|  |  |  |  |
| --- | --- | --- | --- |
| A. |  | C.  |   |
| B. |   | D. |   |

18. A manager is determining the number of hours to assign to part-time employees, *b*, and full-time employees, *k*. These are the conditions the manager must follow:

 The budget allows for only 400 total hours.

 Part-time employees are to work less than three quarters of the total hours of full-time employees.

Which system of inequalities can the manager use to determine the number of hours to assign to each type of employee?

 A. 

 

 B. 

 

 C. 

 

 D. 

 

19. Which ordered pairs are solutions of the system of inequalities shown in the graph below? Select three.

|  |  |
| --- | --- |
|  | A. (−2, −1)B (2, 5)C. (−2, 1) D. (0, −5)E. (−4, 3)F. (2, 8) |
|  |  |

20. What is the complete solution to the system of equations below?

*7x* + 4*y* = 27

2*x* + 4*y* = 2

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**EXTRA CREDIT**

21. Consider the system of equations.

 6*x* – *y* = 13

 2*x* + *y* = 11

 Which ordered pair is the solution to the system of equations?

 A. (4, 11)

 B. (5, 3)

 C. (2, 7)

 D. (3, 5)

22. Consider the equation below.

 4*x* – 10 = 3(2*x* – 4)

 What is the value of *x* that will make the equation true?

 A. -6

 B. -3

 C. 

 D. 3

**A1 Unit Exam – Solving Linear Equations and Inequalities**

**Score Sheet and Report**

|  |  |  |  |
| --- | --- | --- | --- |
| # | Answer | Subdomain Performance | Subdomain |
| 1 |  |  /9 % | Solving Linear Equations in One Variable |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |  /2 % | Solving Linear Inequalities in One Variable |
| 11 |  |
| 12 |  |  /2 % | Solving Systems of Linear Equations in Two Variables |
| 13 |  |
| 14 |  |  /2 % | Create Systems of Linear Equations in Two Variables |
| 15 |  |
| 16 |  |  /1 % | Graph Linear Inequalities in Two Variables |
| 17 |  |  /2 % | Systems of Linear Inequalities |
| 18 |  |
| 19 |  |  /2 | Multiple Selected ResponsePolynomial Expressions |
|  |
|  |
| 20 |  | Constructed Response – Record Your Answer Below |  |
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|  /2 |
| 21 |  |  +  | Extra Credit |
| 22 |  |
|  |  |  |  |
| Total |  /22 % |