A.A.7: Analyze and solve verbal problems whose solution requires solving systems of linear equations in two variables.

1. 060812ia, P.I. A.A.7
Pam is playing with red and black marbles. The number of red marbles she has is three more than twice the number of black marbles she has. She has 42 marbles in all. How many red marbles does Pam have?

[A] 33 [B] 29 [C] 15 [D] 13

2. 080811ia, P.I. A.A.7
Sam and Odel have been selling frozen pizzas for a class fundraiser. Sam has sold half as many pizzas as Odel. Together they have sold a total of 126 pizzas. How many pizzas did Sam sell?

[A] 84 [B] 42 [C] 63 [D] 21

3. 010104a, P.I. A.A.7
Three times as many robins as cardinals visited a bird feeder. If a total of 20 robins and cardinals visited the feeder, how many were robins?

[A] 20 [B] 15 [C] 5 [D] 10

4. 060201a, P.I. A.A.7
Jamie is 5 years older than her sister Amy. If the sum of their ages is 19, how old is Jamie?

[A] 14 [B] 7 [C] 5 [D] 12

5. 080606a, P.I. A.A.7
Sal keeps quarters, nickels, and dimes in his change jar. He has a total of 52 coins. He has three more quarters than dimes and five fewer nickels than dimes. How many dimes does Sal have?

[A] 20 [B] 18 [C] 13 [D] 21

6. 089916a, P.I. A.A.7
At a concert, $720 was collected for hot dogs, hamburgers, and soft drinks. All three items sold for $1.00 each. Twice as many hot dogs were sold as hamburgers. Three times as many soft drinks were sold as hamburgers. The number of soft drinks sold was

[A] 480 [B] 240 [C] 120 [D] 360

7. 080412a, P.I. A.A.7
The ratio of Tariq's telephone bill to Pria's telephone bill was 7:5. Tariq's bill was $14 more than Pria's bill. What was Tariq's bill?

[A] $21 [B] $49 [C] $28 [D] $35

8. 060004a, P.I. A.A.7
Two numbers are in the ratio 2:5. If 6 is subtracted from their sum, the result is 50. What is the larger number?

[A] 35 [B] 45 [C] 40 [D] 55

9. 060531a, P.I. A.A.7
A ribbon 56 centimeters long is cut into two pieces. One of the pieces is three times longer than the other. Find the lengths, in centimeters, of both pieces of ribbon.

10. 010327a, P.I. A.A.7
Arielle has a collection of grasshoppers and crickets. She has 561 insects in all. The number of grasshoppers is twice the number of crickets. Find the number of *each* type of insect that she has.

11. 010022a, P.I. A.A.7
Mary and Amy had a total of 20 yards of material from which to make costumes. Mary used three times more material to make her costume than Amy used, and 2 yards of material was not used. How many yards of materials did Amy use for her costume?

12. 080132a, P.I. A.A.7
The ninth graders at a high school are raising money by selling T-shirts and baseball caps. The number of T-shirts sold was three times the number of caps. The profit they received for each T-shirt sold was $5.00, and the profit on each cap was $2.50. If the students made a total profit of $210, how many T-shirts *and* how many caps were sold?

13. 060123a, P.I. A.A.7
Ben had twice as many nickels as dimes. Altogether, Ben had $4.20. How many nickels *and* how many dimes did Ben have?

14. 010436a, P.I. A.A.7
Using only 32-cent and 20-cent stamps, Charlie put $3.36 postage on a package he sent to his sister. He used twice as many 32-cent stamps as 20-cent stamps. Determine how many of *each* type of stamp he used.

15. 010228a, P.I. A.A.7
A total of 600 tickets were sold for a concert. Twice as many tickets were sold in advance than were sold at the door. If the tickets sold in advance cost $25 each and the tickets sold at the door cost $32 each, how much money was collected for the concert?

16. 060326a, P.I. A.A.7
Seth has one less than twice the number of compact discs (CDs) that Jason has. Raoul has 53 more CDs than Jason has. If Seth gives Jason 25 CDs, Seth and Jason will have the same number of CDs. How many CDs did *each* of the three boys have to begin with?

17. spring9828a, P.I. A.A.7
A total of 800 votes were cast in an election. The table below represents the votes that were received by the candidates. Candidate *D* got at least 30 votes more than Candidate *E*. What is the least number of votes that Candidate *D* could have received?

Candidate	Number of Votes
A	213
B	328
C	39
D	*x*
E	*y*

18. 060917ia, P.I. A.A.7
At Genesee High School, the sophomore class has 60 more students than the freshman class. The junior class has 50 fewer students than twice the students in the freshman class. The senior class is three times as large as the freshman class. If there are a total of 1,424 students at Genesee High School, how many students are in the freshman class?

[A] 236 [B] 202 [C] 235 [D] 205

A.A.7: Analyze and solve verbal problems whose solution requires solving systems of linear equations in two variables.

[1] B

[2] B

[3] B

[4] D

[5] B

[6] D

[7] B

[8] C

[9]
[2] 14 and 42, and appropriate work is shown, such as $x + 3x = 56$, a table, or trial and error with at least three trials and appropriate checks.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but only one of the two lengths is found.
or [1] A correct equation is written and solved, but the lengths are not stated.
or [1] An incorrect equation of equal difficulty is solved appropriately.
or [1] 14 and 42, but no work or fewer than three trials with appropriate checks are shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[10]
[3] 374 grasshoppers and 187 crickets, and appropriate work is shown.
[2] An appropriate equation is solved or appropriate work is shown, but only one correct answer is found, or two correct answers are found but they are not identified clearly as grasshoppers or crickets, or the grasshoppers and crickets are labeled incorrectly.
or [2] Appropriate work is shown, but one computational error is made.
[1] Appropriate work is shown, but more than one computational error is made.
or [1] An incorrect equation of equal difficulty is solved appropriately.
or [1] 374 grasshoppers and 187 crickets, but no work is shown.
[0] 374 and 187, but no work is shown, and the answers are not identified clearly as grasshoppers or crickets.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[11]
[2] 4.5 and an appropriate method is shown, such as the equation $3x + x + 2 = 20$ or some trial and error or arithmetic process.
[1] An appropriate method is shown, but the correct answer is not found.
or [1] 4.5 and no work is shown.
or [1] The student solves the equation $x + 3x - 2 = 20$ and answers 5.5.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[4] 36 T-shirts and 12 caps, and appropriate work is shown, such as an appropriate system of equations or a correct trial-and-error method with at least two trials and appropriate checks.
[3] Appropriate work is shown, but only the correct number of T-shirts or the correct number of caps is determined.
or [3] One error is made, resulting in an incorrect number of T-shirts or caps, but the corresponding number of the other item is determined appropriately.
[2] An appropriate method is shown, but no answer is found.
or [2] The variables are represented correctly, and a correct equation or system of equations is written, but the process is not completed.
or [2] 36 T-shirts and 12 caps, but only one trial and appropriate checks are shown.
or [2] The variables are represented correctly, but an incorrect equation is written, but the solution is completed appropriately.
[1] 36 T-shirts and 12 caps, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
[12]

[2] 42 nickels and 21 dimes, and appropriate work is shown, such as $0.1x + (0.05)2x = 4.20$ or a guess and a check with a minimum of two trials and appropriate checks or another appropriate method.
[1] 42 nickels or 21 dimes, but appropriate work is shown.
or [1] Appropriate work is shown, but no answer or an incorrect answer is found.
or [1] 42 nickels and 21 dimes, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
[13]

[3] Four 20-cent and eight 32-cent stamps, and appropriate work is shown, such as a system of equations, or a linear equation such as $2x(.32) + .20x = 3.36$, or trial and error with at least three trials and appropriate checks.
[2] Appropriate work is shown, but one computational error is made, but appropriate quantities are found for each stamp.
or [2] Appropriate work is shown, but the quantity for only one of the stamps is found.
or [2] Appropriate work is shown, but the solutions are not labeled or the labels are reversed.
or [2] The trial-and-error method is used to find correct solutions, but only two trials and appropriate checks are shown.
[1] Appropriate work is shown, but two or more computational errors are made, but appropriate quantities are found for each stamp.
or [1] The trial-and-error method is attempted, and at least six systematic trials and appropriate checks are shown, but no solution is found.
or [1] An incorrect equation or system of equations of equal difficulty is solved appropriately for both solutions.
or [1] A correct equation or system of equations is written, but no further correct work is shown.
or [1] Four 20-cent and eight 32-cent stamps, but no work or only one trial with an appropriate check is shown.
[0] Four and eight, but no work is shown, and the solutions are not labeled.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
[14]

[3] $16,400, and appropriate work is shown, such as
200 tickets sold at the door $32 = $ 6,400
400 tickets sold in advance $25 = $10,000
$16,400
[2] The correct number of tickets is shown, but one computational error is made in computing the total amount of money collected.
or [2] $6,400 and $10,000 are calculated correctly, but they are not added to obtain the total.
[1] The numbers of tickets, 200 and 400, are calculated correctly.
or [1] An appropriate solution is found, but it is based on incorrect numbers of tickets.
or [1] $16,400, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[15]

[3] Seth had 101, Jason had 51, and Raoul had 104, and appropriate work is shown, such as $x + 25 = (2x - 1) - 25$ or trial and error with at least three trials and appropriate checks.
[2] Appropriate work is shown, but one computational error is made.
or [2] 101, 51, and 104, and appropriate work is shown, but the solutions are not labeled or are labeled incorrectly.
or [2] A correct equation is solved, but the number of CDs for only one boy is found.
or [2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.
[1] Appropriate work is shown, but more than one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made, but an appropriate number of CDs is found for each boy.
or [1] A correct equation is written, but no further correct work is shown.
or [1] Seth had 101, Jason had 51, and Raoul had 104, but no work or only one trial with an appropriate check is shown.
[0] Seth had 101 or Jason had 51 or Raoul had 104, but no work is shown.
or [0] 101, 51, and 104, but no work is shown and the solutions are not labeled or are labeled incorrectly.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[16]

[3] Correct answer of 125 with appropriate equations or method showing that 220 votes were split between *D* and *E* so that *D* had at least 30 votes more than *E*.
[2] An appropriate method to arrive at 220 votes for *D* and *E* and shows a difference of 30 votes but then answer is incorrect such as 140.
[1] Answer 125 with no appropriate method shown.
or [1] Computes the 220 votes for *D* and *E* and merely divides them by 2 to arrive at 110.
or [1] Subtracts 30 from 220 to arrive at answer of 190.

[17]

[18] B