Selected Response Key

#	Question Type	Learning Target	Nevada Academic Content Standard(s)	DOK Level	Key
1	MC	1.2	N.Q.A.3	1	C
2	MC	1.3	N.Q.A.1	2	D
3	MC	1.5	A.SSE.A.1a	1	B
4	MC	1.6	A.SSE.A.1b	2	C
5	MTF	1.7	A.REI.A.1	1	A
6	MTF	1.7	A.REI.A.1	1	B
7	CR	1.8	A.CED.A.1, A.SSE.A.1, A.SSE.A.2	3	—
8	MC	2.4	A.CED.A.1	1	B
9	CR	2.5	A.REI.B.3	2	—
10	MC	2.7	A.CED.A.1	1	D
11	MC	3.1	F.IF.A.2	1	A
12	MC	3.1	F.IF.A.1	1	A
13	MC	3.3	A.CED.A.3	2	B
14	MC	3.3	F.IF.B.4	2	B
15	MC	3.3	F.IF.B.5	2	D
16	MC	3.3	F.BF.A.1b	2	B
17	CR	3.3	F.IF.B.4, F.IF.B.5, F.BF.A.1a	2	—
18	CR	3.3	F.IF.A.1	2	—
19	MC	3.6	F.BF.A.2	1	B
20	MC	3.6	F.BF.A.2	1	C
21	MC	3.6	F.BF.B.3	1	D
22	MC	3.6	F.BF.A.2	2	B
23	MC	3.6	F.IF.A.3	2	D
24	CR	3.6	F.IF.A.3, F.IF.C.9, F.BF.A.2	2	—
25	MC	3.7	F.BF.A.1a	2	C
26	MTF	4.1	F.LE.A.1b	2	A
27	MTF	4.1	F.LE.A.1b	2	B
28	MC	4.2	F.IF.C.7a	1	C
29	MC	4.3	F.IF.B.6	1	B
30	MC	4.3	F.IF.C.7a	1	B
31	MC	4.3	F.IF.B.6	2	A
32	MC	4.3	F.IF.B.6	1	C
33	MTF	4.3	F.IF.B.6	1	A
34	MTF	4.3	F.IF.B.6	1	B
35	MC	4.4	F.LE.B.5	1	B
36	MC	4.4	A.REI.D.10	1	A
37	MC	4.4	F.LE.B.5	1	C
38	MC	4.5	A.REI.D.12	1	B
39	MC	4.5	A.REI.D.12	1	D
40	MC	4.6	A.CED.A.2	2	A
41	MC	4.6	F.LE.A.2	1	B
42	MTF	4.6	A.REI.D.12	1	B
43	MTF	4.6	A.REI.D.12	1	B
44	MTF	4.6	A.REI.D.12	1	A
45	MC	4.6	A.CED.A.2	1	D
46	MC	4.6	A.REI.D.11	2	B
47	MC	4.7	A.CED.A.4	1	D
48	MC	4.7	A.CED.A.4	1	A
49	CR	4.7	N.Q.A.1, N.Q.A.3, A.CED.A.4	2	—
50	MTF	4.8	F.IF.C.9	2	B

Selected Response Key

#	Question Type	Learning Target	Nevada Academic Content Standard(s)	DOK Level	Key
51	MTF	4.8	F.IF.C.9	2	A
52	MTF	4.8	F.IF.C.9	2	B
53	MC	4.9	F.BF.B.3	1	C
54	MC	4.9	F.BF.B.3	1	A
55	MC	5.1	F.BF.B.4a	1	C
56	MC	5.3	F.IF.C.7b	2	C
57	CR	5.3	F.IF.C.7b	2	—
58	MC	5.4	F.IF.C.7b	2	B
59	MC	5.4	F.IF.C.7b	2	B
60	MC	5.4	F.IF.C.7b	2	B
61	MC	5.4	F.IF.C.7b	1	C
62	MC	6.1	A.REI.C.6	2	D
63	MC	6.1	A.REI.C.6	2	B
64	MC	6.1	A.SSE.A.2	2	C
65	MC	6.1	A.REI.C.6	1	D
66	MC	6.1	F.BF.A.1a	2	D
67	MC	6.1	A.REI.C.6	2	B
68	MC	6.1	A.REI.C.6	1	B
69	CR	6.1	A.REI.C.5, A.REI.C.6	3	—
70	CR	6.1	A.CED.A.2, A.REI.D.11	2	—
71	CR	6.1	A.REI.C.6	2	—
72	MC	6.2	A.REI.C.6	2	D
73	MC	6.2	A.REI.C.6	2	D
74	MC	6.3	A.CED.A.3	2	A
75	ER	6.4	N.Q.A.2, A.CED.A.3, A.REI.C.6, F.BF.A.1a, F.BF.A.1b	3	—
76	CR	6.5	A.REI.C.6, A.CED.A.3, A.REI.D.12	2	—
77	MC	6.5	A.CED.A.3, A.REI.D.12	1	C

Constructed Response Solutions

7. This question assesses the student's ability to write mathematical expressions from a context, where a quantity may be a specific numerical value or a variable, and to see structure in equivalent mathematical expressions.

(a) $p+0.08p+0.15p$ or $p+\frac{8}{100}p+\frac{15}{100}p$ or equivalent

(b) $p+\frac{x}{100}p+\frac{g}{100}p$ or equivalent

(c) Yes, this works. Dividing by 10 gives one-tenth or 10% of the price. Dividing that by 2 gives one-twentieth or 5% of the price. Adding those two numbers gives 15% of the price. $p/10+\frac{(p/10)}{2}=p/10+p/20=0.10p+0.05p=0.15p$

---

9. This question assesses the student's ability to solve absolute value equations.

(a) x=-27 and 15

(b) x=-5 and 7

(c) y= ± 9

(d) no solution

---

17. This question assesses the student's ability to build a linear function from a context, determine its domain and range, construct a graph of the function, and identify important points on the function.

(a) Let A represent the amount Steve owes after a payment is made in month m of the loan. Then $A=\$4800-\frac{\$150}{\text{month}}m$.

(b) Steve will pay off the loan when $0=\$4800-\frac{\$150}{\text{month}}m$, or when m = 32 months. The domain of the function is the number of months since the loan was given, namely the integers from 0 to 32, inclusive. The range of the function are the amounts remaining on the loan each month, namely {4800, 4650, 4500, ... 150, 0}.

(c) Important points must include when the loan was taken out (0 months, $4,800), and when the loan is paid off (32 months, $0). No other points are necessary, but any identified must be accompanied by a clear and reasonable explanation as to why they are important.

---

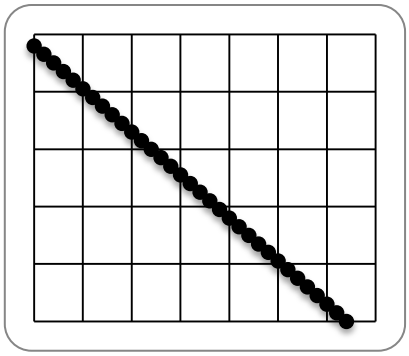
18. This question assesses the student's understanding of the concept of a function.

A function is a relation where for each element of the domain, there is only one element in the range. In $y = x^2$, when $x = -2$, y=4. There is only one value of y for that value of x. When x=2,y=4,and again there is only one value of y for that value of x. To be a function, it is NOT the case that for any value of y there must be only one x.

Constructed Response Solutions

---

24. This question assesses the student's ability to explicitly define an arithmetic sequence, compare the rates of change of two sequences, and solve a linear equation.



(a) $t(n) = -7 + 3n$

(b) These are arithmetic sequences and, thus, linear functions. The rates of change are their slopes. The slope of t is 3 and the slope of s is 2. Sequence t grows at a rate 1.5 times that of sequence s.

(c)
$$t(n) = s(n)$$
$$-7 + 3n = 2 + 2n$$
$$n = 9$$

---

49. This question assesses the student's ability to determine the units of quantities in a formula, convert measurements and use unit analysis, and solve literal equations for a given variable.

(a) Unit analysis on the right side of the equation gives $\frac{\text{m} - \text{m}}{\text{s}} = \frac{\text{m}}{\text{s}}$, so v is measured in $\frac{\text{m}}{\text{s}}$.

(b)
$$x_0 = 3300 \text{ feet} \times \frac{1 \text{ mile}}{5280 \text{ feet}}$$
$$= 3300 \times \frac{1}{5280} \times \frac{\text{mile}}{\cancel{\text{feet}}}$$
$$= 0.625 \text{ miles}$$

Since the measurement 3,300 ft/s has 2 significant digits, the conversion should be rounded to two significant digits, so $x_0 \approx 0.63$ miles.

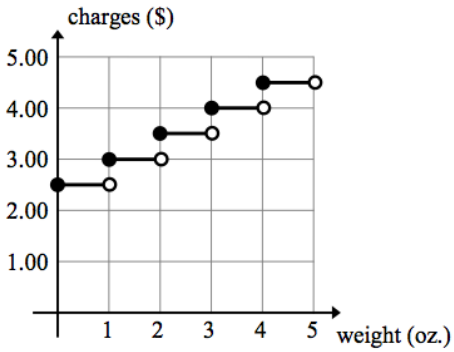
(c)
$$v = \frac{x_f - x_0}{t}$$
$$vt = x_f - x_0$$
$$vt + x_0 = x_f$$

Constructed Response Solutions

57. This question assesses the student's ability to find solutions to graph quadratic functions and describe characteristics of the function.

(a) $charges = \$2.50 + \frac{\$0.50}{\text{pound}}[\![weight]\!]$

(b)



69. This question assesses the student's ability to find the solution to a system of linear equations and explain why replacing one equation in a system with the sum of that equation and multiple of the other produces a system with the same solutions.

(a) (10, 25) Students may use any method (graphing by hand, graphing using technology, substitution, elimination, guess-and-check, etc.) to get this answer.

(b) When the ordered pair (10, 25) is substituted into each equation, a true statement results. Since the left side of each equation equals the right side of each equation, then the sum of the left sides ($-4x + 11y$) must equal the sum of the right sides (235). The ordered pair (10, 25) must also satisfy this equation.

70. This question assesses the student's ability to identify solutions of a linear equation in two variables, create a system of inequalities with a given solution, and create a system of inequalities with no solution.

(a) Answers will vary.

(b) Answers will vary, but one point identified in part (a) must satisfy the equation and one must not.

(c) $y = -2x$ is the only acceptable answer.

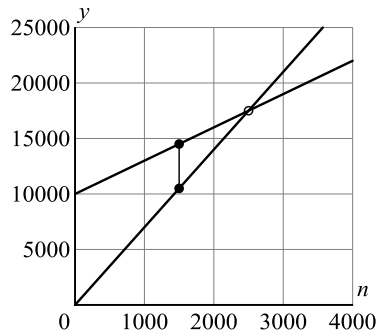
Constructed Response Solutions

71. This question assesses the student's ability to build linear functions based on a contextual description, graph linear functions, identify solution to a system of linear equations, and evaluate a function in context.

(a) $C(n) = \$10{,}000 + \frac{\$3}{\text{doll}}n$

$I(n) = \frac{\$7}{\text{doll}}n$

(b)



(c) $\$10{,}000 + \frac{\$3}{\text{doll}}n = \frac{\$7}{\text{doll}}n$

$\$10{,}000 = \frac{\$4}{\text{doll}}n$

$\frac{\$10{,}000}{\frac{\$4}{\text{doll}}} = n$

$2500 \text{ dolls} = n$

(d) $I(1500) - C(1500) = \$10{,}500 - \$14{,}500 = -\$3{,}000$, so if the company only produced and sold 1500 dolls, they would lose $3,000.

---

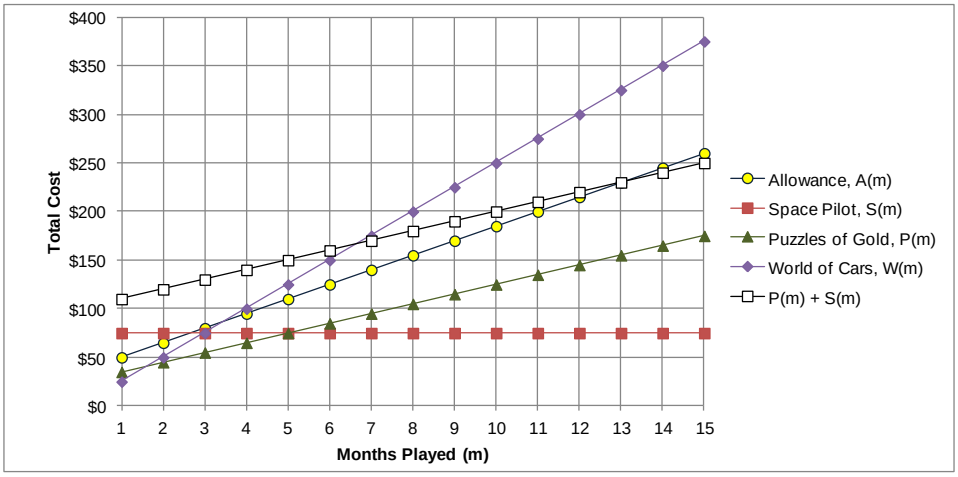
75. This question assesses the student's ability to create linear functions, solve systems of linear equations, and combine linear functions in context.

(a) The costs for each game and allowance/savings over the specified periods are:

Game	**2 months**	**5 months**	**7 months**	***m* months played**
Space Pilot	\$75	\$75	\$75	$S(m)$ = \$75
Puzzles of Gold	\$25 + \$10(2)= \$45	\$25 + \$10(5) = \$75	\$25 + \$10(7) = \$95	$P(m)$ = \$25 + \$10m
World of Cars	\$25(2) = \$50	\$25(5) = \$125	\$25(7) = \$175	$W(m)$ = \$25m
Least Cost?	**Puzzles of Gold**	**Space Pilot & Puzzles of Gold**	**Space Pilot**	
Allowance/Savings				$A(m)$ = \$50 + \$15(m – 1) or $A(m)$ = \$35 + \$15m

(b,c) A graph would be best to answer this part, but students may use a table or solve inequalities to justify their answer.

Constructed Response Solutions



- Juan can afford Puzzles of Gold for the next year (and beyond) because he has enough saved to buy it and because the monthly fee is less than his allowance.
- Juan can afford World of Cars right away, but on the 3rd month he will not have enough money to pay the subscription fee, since the monthly fee is greater than his allowance and he will have exhausted his savings.
- Juan cannot afford Space Pilot until he receives his allowance at the end of the 2nd month, but can afford it for as long as he wants after that because he will have saved enough money to purchase it and there is no monthly fee.
- Other arguments are also acceptable, such as Juan could afford World of Cars for one year (costing $300) if he saved his allowance for 18 months.

(d) Because the cost of World of Cars exceeds Juan's finances after 2 months, consider the other two games only. The combined cost of Puzzles of Gold and Space Pilot is $P(m) + S(m) = \$25 + \$10m + \$75 = \$100 + \$10m$. Since his savings are less than the combined game prices ($50 < $100), he cannot afford them both now. However, since his allowance grows faster than the total subscription fees ($15 > $10), he will be able to eventually afford both, when $A(m) \geq P(m) + S(m)$, or $\$35 + \$15m \geq \$100 + \$10m$. Solving, $m \geq 13$. Juan must wait 13 months to afford both at the same time.

Other arguments are acceptable, such as buying Puzzles of Gold now and buying another later, for example. In that case, Juan's finances would be $A(m) - P(m) = \$10 + \$5m$. He would still need 13 months to save enough to buy Space Pilot for $75.

---

76. This question assesses the student's ability to solve application problems using systems of linear inequalities (linear programming) and interpret linear equations and inequalities in context.

(a) The vertices are (0, 0), (600, 0), (0, 500), and the intersection of $L = 500 - \frac{1}{2}S$ and $L = 800 - \frac{4}{3}S$ or (360, 320).

(b) Income is maximized at $1,680 when 360 small and 320 large frogs are produced.

Vertex	Small (x $2)	Large (x $3)	Income
(0, 0)	0	0	$0
(600, 0)	600	0	$1,200
(0, 500)	0	500	$1,500
(360, 320)	360	320	$1,680

Constructed Response Solutions

(c) It takes $\frac{1}{2}$ sheet of paper to make a small frog and one sheet of paper to make a large frog. In this equation, $\frac{1}{2}S$ represents the number of sheets of paper used to make small frogs and L represents the number of sheets of paper needed to make large frogs, the total of which may not exceed the 500 sheets of paper the club has.

Notes on Practice Materials

The Algebra I Practice Materials are provided to help teachers and students prepare for the CCSD Semester Exams in Algebra I.

The questions are representative of the style, format, and type that will be on the exams. They are not, however, completely parallel in construction. That is, practice questions on a particular standard show how that standard may be assessed, but the questions on the actual exam could assess that standard in a different way. Teachers must provide students with opportunities to explore all aspects of a standard, and not simply focus on those addressed by the practice materials.

There are 3 types of questions in the practice materials that will appear on the semester exams.

- MC – Multiple Choice. This is a traditional selected-response type of question. Each item will have 3 or 4 possible responses.
- MTF – Multiple True/False. These items will have 2–4 true/false questions based on a common lead-in statement or concept. These should remain grouped together when provided for practice.
- CR – Constructed response. These items may have multiple parts that address one or more standards. The DOK level is the overall level of the item, though some parts may be at lower levels. Short CR items average about 6–8 minutes to complete; longer CR items average 10–15 minutes to complete.

A fourth type of question is the Extended Response (ER). These will not appear on the semester exam at this time, but are indicative of longer, performance-type tasks that will appear on the Smarter Balanced Assessments beginning in 2013–2014.

Sample solutions are provided for CR and ER questions. Student methods may vary and any logical, mathematically correct approach should be accepted as correct.