

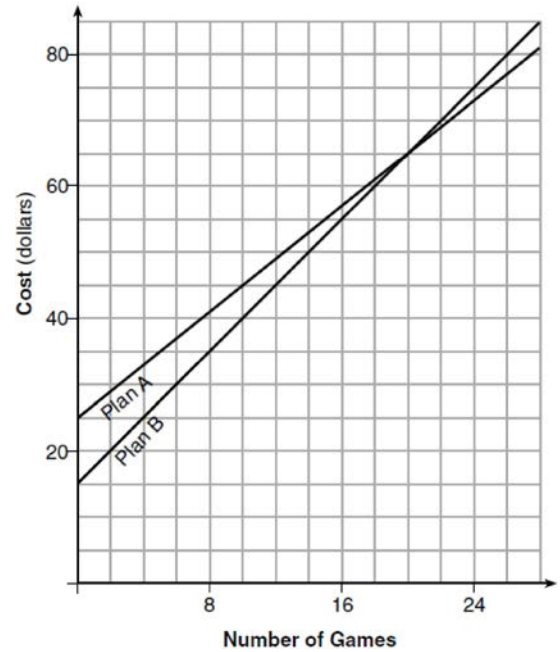
### A.CED.A.3: Modeling Linear Systems 2

- 1 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends \$45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]
- 2 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled \$15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled \$45.90. Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]
- 3 The difference between two numbers is 28. The larger number is 8 less than twice the smaller number. Find *both* numbers. [Only an algebraic solution can receive full credit.]
- 4 The cost of 3 markers and 2 pencils is \$1.80. The cost of 4 markers and 6 pencils is \$2.90. What is the cost of *each* item? Include appropriate units in your answer.
- 5 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil. [Only an algebraic solution can receive full credit.]
- 6 During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold the first week. [Only an algebraic solution can receive full credit.]
- 7 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks. Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink. Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.
- 8 An animal shelter spends \$2.35 per day to care for each cat and \$5.50 per day to care for each dog. Pat noticed that the shelter spent \$89.50 caring for cats and dogs on Wednesday. Write an equation to represent the possible numbers of cats and dogs that could have been at the shelter on Wednesday. Pat said that there might have been 8 cats and 14 dogs at the shelter on Wednesday. Are Pat's numbers possible? Use your equation to justify your answer. Later, Pat found a record showing that there were a total of 22 cats and dogs at the shelter on Wednesday. How many cats were at the shelter on Wednesday?

9 For a class picnic, two teachers went to the same store to purchase drinks. One teacher purchased 18 juice boxes and 32 bottles of water, and spent \$19.92. The other teacher purchased 14 juice boxes and 26 bottles of water, and spent \$15.76. Write a system of equations to represent the costs of a juice box,  $j$ , and a bottle of water,  $w$ . Kara said that the juice boxes might have cost 52 cents each and that the bottles of water might have cost 33 cents each. Use your system of equations to justify that Kara's prices are *not* possible. Solve your system of equations to determine the actual cost, in dollars, of each juice box and each bottle of water.

10 Ian is borrowing \$1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of \$60 per month. Ken is borrowing \$600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of \$20 per month. Write an equation that can be used to determine after how many months the boys will owe the same amount. Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time. Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

11 The graph below models the cost of renting video games with a membership in Plan A and Plan B.



Explain why Plan B is the better choice for Dylan if he only has \$50 to spend on video games, including a membership fee. Bobby wants to spend \$65 on video games, including a membership fee. Which plan should he choose? Explain your answer.

### A.CED.A.3: Modeling Linear Systems 2

#### Answer Section

1 ANS:

$$d = 2c \quad 2(2c) + 2c = 45$$

$$2d + 2c = 45 \quad 6c = 45$$

$$c = 7.50$$

REF: 011534ia

2 ANS:

$$p + 2s = 15.95 \quad 5p + 10s = 79.75$$

$$3p + 5s = 45.90 \quad 6p + 10s = 91.80$$

$$p = 12.05$$

REF: 011734ai

3 ANS:

$$L - S = 28 \quad 2S - 8 = S + 28$$

$$L = 2S - 8 \quad S = 36$$

$$L = S + 28 \quad L = 36 + 28 = 64$$

REF: 081335ia

4 ANS:

$$m = 50¢, p = 15¢. \quad 3m + 2p = 1.80. \quad 9m + 6p = 5.40 \quad 4(.50) + 6p = 2.90$$

$$4m + 6p = 2.90 \quad 4m + 6p = 2.90 \quad 6p = .90$$

$$5m = 2.50 \quad p = \$0.15$$

$$m = \$0.50$$

REF: 080837ia

5 ANS:

$$3n + 4p = 8.50 \quad 3(2.50) + 4p = 8.50$$

$$5n + 8p = 14.50 \quad 4p = 1$$

$$6n + 8p = 17 \quad p = 0.25$$

$$n = 2.50$$

REF: 011335ia

6 ANS:

$$a + o = 108 \quad 64 + o = 108$$

$$5a + 3o = 452 \quad o = 44$$

$$3a + 3o = 324$$

$$2a = 128$$

$$a = 64$$

REF: 061437ia

7 ANS:

$$2p + 3d = 18.25 \quad 4p + 6d = 36.50 \quad 4p + 2(2.25) = 27.50$$

$$4p + 2d = 27.50 \quad 4p + 2d = 27.50 \quad 4p = 23$$

$$4d = 9 \quad p = 5.75$$

$$d = 2.25$$

REF: 011533ai

8 ANS:

$$2.35c + 5.50d = 89.50 \quad \text{Pat's numbers are not possible: } 2.35(8) + 5.50(14) \neq 89.50 \quad c + d = 22$$

$$18.80 + 77.00 \neq 89.50 \quad 2.35c + 5.50(22 - c) = 89.50$$

$$95.80 \neq 89.50 \quad 2.35c + 121 - 5.50c = 89.50$$

$$-3.15c = -31.50$$

$$c = 10$$

REF: 061436ai

9 ANS:

$$18j + 32w = 19.92 \quad 14(.52) + 26(.33) = 15.86 \neq 15.76 \quad 7(18j + 32w = 19.92) \quad 18j + 32(.24) = 19.92$$

$$14j + 26w = 15.76 \quad 9(14j + 26w = 15.76) \quad 18j + 7.68 = 19.92$$

$$126j + 224w = 139.44 \quad 18j = 12.24$$

$$126j + 234w = 141.84 \quad j = .68$$

$$10w = 2.4$$

$$w = .24$$

REF: 081637ai

10 ANS:

$$I = 1000 - 60x \quad . \quad x = 10. \quad 1000 - 60(10) = 400. \quad \text{Ian is incorrect because } I = 1000 - 6(16) = 40 \neq 0$$

$$K = 600 - 20x$$

$$1000 - 60x = 600 - 20x$$

REF: 011737ai

11 ANS:

Plan  $A$ :  $C = 2G + 25$ , Plan  $B$ :  $C = 2.5G + 15$ .  $50 = 2.5G + 15$   $50 = 2G + 25$  With Plan  $B$ , Dylan can rent 14

$$35 = 2.5G \quad 25 = 2G$$

$$G = 14 \quad G = 12.5$$

games, but with Plan  $A$ , Dylan can buy only 12.  $65 = 2(20) + 25 = 2.5(20) + 15$  Bobby can choose either plan, as he could rent 20 games for \$65 with both plans.

REF: 081728ai