UNIT 7 EXERCISES 1-5

MONEY

2005B

1. **(A)** The scouts bought $1000/5 = 200$ groups of five candy bars at a total cost of $200 \cdot 2 = 400$ dollars. They sold $1000/2 = 500$ groups of two candy bars for a total of $500 \cdot 1 = 500$ dollars. Their profit was $\$500 - \$400 = \$100$.

2009B

1. **Answer (B):** Make a table for the cost of the muffins and bagels:

Cost of Muffins	Cost of Bagels	Total Cost
$0 \cdot 0.50 = 0.00$	$5 \cdot 0.75 = 3.75$	3.75
$1 \cdot 0.50 = 0.50$	$4 \cdot 0.75 = 3.00$	3.50
$2 \cdot 0.50 = 1.00$	$3 \cdot 0.75 = 2.25$	3.25
$3 \cdot 0.50 = 1.50$	$2 \cdot 0.75 = 1.50$	3.00
$4 \cdot 0.50 = 2.00$	$1 \cdot 0.75 = 0.75$	2.75
$5 \cdot 0.50 = 2.50$	$0 \cdot 0.75 = 0.00$	2.50

The only combination which is a whole number of dollars is the cost of 3 muffins and 2 bagels.

2014B

1. **Answer (C):** Leah has 7 pennies and 6 nickels, which are worth 37 cents.

2017A

1. **Answer (D):** The cheapest popsicles cost $\$3.00 \div 5 = \$0.60$ each. Because $14 \cdot \$0.60 = \$8.40$ and Pablo has just \$8, he could not pay for 14 popsicles even if he were allowed to buy partial boxes. The best he can hope for is 13 popsicles, and he can achieve that by buying two 5-popsicle boxes (for \$6) and one 3-popsicle box (for \$2).

OR

If Pablo buys two single popsicles for \$1 each, he could have bought a 3-popsicle box for the same amount of money. Similarly, if Pablo buys three single popsicles or both one 3-popsicle box and one single popsicle, he could have bought a 5-popsicle box for the same amount of money. If Pablo buys two 3-popsicle boxes, he could have bought a 5-popsicle box and a single popsicle for the same amount of money. The previous statements imply that a maximum number of popsicles for a given amount of money can be obtained by buying either at most one single popsicle and the rest 5-popsicle boxes, or a single 3-popsicle box and the rest 5-popsicle boxes. When Pablo has \$8, he can obtain the maximum number of popsicles by buying two 5-popsicle boxes and one 3-popsicle box. This gives a total of $2 \cdot 5 + 1 \cdot 3 = 13$ popsicles.

2018A

2. **Answer (C):** The 5-pound rocks have a value of $\$14 \div 5 = \$2.80$ per pound; the 4-pound rocks have a value of $\$11 \div 4 = \$2.75$ per pound; the 1-pound rocks have a value of \$2 per pound. It is not to Carl's advantage to take 1-pound rocks when he can take the larger rocks. Therefore the only issue is how many of the more valuable 5-pound rocks to take, including as many 4-pound rocks as possible in each case. The viable choices are displayed in the following table.

5-pound rocks ($14 each)	4-pound rocks ($11 each)	1-pound rocks ($2 each)	value
3	0	3	\$48
2	2	0	\$50
1	3	1	\$49
0	4	2	\$48

The maximum possible value is \$50.

Note: Although the 5-pound rocks are the most valuable per pound, it was not to Carl's advantage to take as many of them as possible. This situation is an example of the classic knapsack problem for which the so-called "greedy algorithm" is not optimal.

2006B

4. **(A)** The five items cost approximately $8+5+3+2+1 = 19$ dollars, so Mary's change is about \$1.00, which is 5 percent of her \$20.00.

2009A

4. **Answer (A):** The value of any combination of four coins that includes pennies cannot be a multiple of 5 cents, and the value of any combination of four coins that does not include pennies must exceed 15 cents. Therefore the total value cannot be 15 cents. The other four amounts can be made with, respectively, one dime and three nickels; three dimes and one nickel; one quarter, one dime and two nickels; and one quarter and three dimes.