Problem of the Week
Problem A and Solution
Non-cents

Problem

Canadian prices are normally in dollars and cents, with the dollar amount appearing before the decimal point and the cents amount appearing after the decimal point.

Zahra has a store that has decided to get rid of cents in their pricing. This means that all new prices will be rounded to the nearest dollar amount so that each price ends with .00.

These are some of the items in her store as well as their original prices:

Item	Price
Rollerblades	$54.59
Helmet	$25.25
Elbow Pads	$15.88
Skateboard	$75.75
Bicycle	$105.32
Bike Lock	$25.44
Wrist Guards	$20.99

(a) What will the new price of each item be?

(b) If she sells one of each type of item, will Zahra be making more money or less money than before? Justify your answer.

Solution

(a) Here are the new prices rounded to the nearest dollar:

Item	New Price
Rollerblades	$55.00 (rounded up)
Helmet	$25.00 (rounded down)
Elbow Pads	$16.00 (rounded up)
Skateboard	$76.00 (rounded up)
Bicycle	$105.00 (rounded down)
Bike Lock	$25.00 (rounded down)
Wrist Guards	$21.00 (rounded up)

(b) There are many ways to determine the impact of the new prices. One option is to find the totals of the original prices and the new prices, and then calculate the difference of those totals. To keep things a bit simpler, since the tens and hundreds place values have not changed, then we can ignore the tens and hundreds place values of the prices.

Original total (ignoring the tens and hundreds place values):

$$4.59 + 5.25 + 5.88 + 5.75 + 5.32 + 5.44 + 0.99 = \$33.22$$

New total (ignoring the tens and hundreds place values):

$$5 + 5 + 6 + 6 + 5 + 5 + 1 = \$33$$

We see that the new total is 22 cents less than the original total. Therefore, Zahra will be making less money with the new pricing.

Another way to determine the difference is to find out how much more or less the new individual prices will be compared to the old prices. These amounts are all in cents. For example:

- The new rollerblades price is 41 cents more than the original price since we rounded up and $59 + 41 = 100$.

- The new helmet price is 25 cents less than the original price since we rounded down.

Zahra will make more money on the items where the prices were rounded up, and less on the items that were rounded down.

More money: $41 + 12 + 25 + 1 = 79$ cents
Less money: $25 + 32 + 44 = 101$ cents

The "less money" amount is greater than the "more money" amount. Overall, Zahra will make $101 - 79 = 22$ cents less than before with the new pricing.