Due Date: Friday 11th August 2023

Junior School Family Maths Challenge!

TASK 2

So how much does it cost?

Figure This! Is a discount of 30% off the original price, followed by a discount of 50% off the sale price, the same as a discount of 80% from the original price?

Hint: What would a $100 item cost after these discounts?

Understanding percentages is critical in many everyday and business decisions. Survey results, medical reports, weather information, and interest rates all involve percentages.

FigureThis!

Get Started:

Choose a price for an item, say $100 as suggested in the hint. Calculate what the sale price would be after a 30% discount. Then find out how much the item would cost at 50% off the sale price.

Complete Solution:

- If an item originally costs $100, the tables below show the different final costs. They are not the same.

Original Price	30% Off	Cost on Sale	50% Off Sale Price	Final Cost
$100	30% • $100 = $30	$100 - $30 = $70	50% • $70 = $35	$70 - $35 = $35

Original Price	80% Off	Final Cost
$100	80% • $100 = $80	$100 - $80 = $20

- For the item on sale at 30% off, you would need to pay 70% of the price. So an additional discount of 50% off the sale price would bring the price to 35% (that is, 50% • 70%) of the original price. Thus, a $100 item would cost $35 after both discounts. An 80% off sale means that you pay 100% – 80%, or 20% of the original cost of the item. Thus, an item that originally cost $100 on sale at 80% off costs 20% • $100 or $20. The costs are not the same.
- You can generalize the problem. If *P* is the original price of an item, with the two discounts, one of 30% followed by another of 50%, you would pay 0.50 • (0.70 • *P*) or 0.35*P*, which is not the same as 0.2*P*.

Try This:

- Look at some of the discounts offered in newspaper or magazine ads. Find examples that use multiple discounts and calculate the actual cost per item.

Additional Challenges:

1. Would you rather become 50% richer and then 50% poorer, or become 50% poorer and then 50% richer?
2. The original price of a washing machine is $500. On the first day of each month, the store will reduce its price by 10% of the previous price. How long will it take before the sale price is half the original price?
3. An ad in a clothing store reads, "Clearance: 60% to 75% off when you take an extra 50% off the previous sale price." The previous sale price on a pair of jeans was $24.99, down from an original $29.99. Is the ad correct for this item?

Things to Think About:

- A discount of 50% is the same as a half-price sale.
- A discount of 25% is the same as paying 75% of the price.
- A cost of 10% more than a price is 110% of the listed price.
- In what situations are percentages more useful than fractions?

Did You Know That?

- The word percent comes from the Latin *per centum*, meaning "per 100."
- Pressing the percent key on some calculators changes the percentage to a decimal.

Resources:

Books:

- Paulos, John Allen. *Innumeracy: Mathematical Illiteracy and Its Consequences.* New York: Hill and Wang, 1988.
- Paulos, John Allen. *A Mathematician Reads the Newspaper.* New York: Basic Books, 1995.

Answers to Additional Challenges:

(1.) :
The result is the same.

(2.) :
In the seventh month, the cost will be less than half the original price.

(3.) :
The final cost is $24.99 – (0.5 • $24.99), or $12.50. The total discount from the original price is $29.99 – $12.50 or $17.49. Since $17.49 is about 58% of $29.99, the ad is not correct.