50% on is Not the Same as 50% off!

Achievement Objectives:

Understand operations on fractions, decimals, percentages, and integers.

Specific Learning Outcomes:
Estimate and find percentages of whole number and decimal amounts.
Description of mathematics:
Number Framework Stage 8.

Required Resource Materials:
50% on / 50% off (Material Master 8-33).
Calculators.
Activity:
Apparent contradictions can occur in percentage calculations when the percentages are calculated on the wrong quantity.

Using Number Properties

Problem: "Sally notices Newtown's population has increased from 1983 to 2003. She claims the percentage increase is 25%. Samuel claims the increase is 20%. Explain how both can be correct."

 (*Answer: Sally will argue the increase is 5 000 people.*

Comparing this to the 1983 population, this is a fractional increase of 5000/20000 = 0.25 = 25%. But Samuel will argue the increase is 5 000 people, and comparing this to the 2003 population, this is a fractional increase of 5000/25000 = 0.2 = 20%. Both points of view are valid.)

Problem: "Harry buys cans of baked beans from the wholesaler to sell at his dairy. The wholesaler's card says that Harry will make 35% profit. Harry calculates 1.35 x 1.30 and gets 1.755 not 2.00. Explain what is going wrong."

(Answer: This is tricky. The wholesaler reasonably argues that Harry should be interested in profit as 35% of the money he gets in his till, not the amount he paid for the baked beans. So the 35% profit refers to a percentage of selling price not cost price.)

"Check that the wholesaler is correct."

(Answer: 0.65 x $2.00 = $1.30 is correct.)

Problem: "Harry buys packets of chocolate biscuits at the wholesaler for $1.95 each. He wants to makes 35% profit on the selling price. What should Harry charge for a packet of biscuits at his shop?"

Discuss how to build up the flow chart and why Harry should charge 1.95 ÷ 0.65 = $3.00 for a packet of biscuits.

(Answer: 35% of the unknown selling price that needs to be multiplied is gross profit, so 65% of this price must be used to pay the wholesaler. The flow chart shows ? x 0.65 = $1.95. So, reversing the flow chart, the selling price of a packet of biscuits is 1.95 ÷ 0.65 = $3.00.)

Examples: Worksheet (Material Master 8–33).

Understanding Number Properties:

Harry decides to make the mark-up 40% on the selling price of the goods at his store. Make up a problem with this new mark-up and solve it.