

Taxed Carts: Estimate and Prove

GRADE 5

MATHEMATICS

F1.2

B2.3

Estimate before you calculate. An estimate far from your exact answer is a warning that one of them is wrong. Multiplying by 0.1 shifts every digit one place right; multiplying by 0.01 shifts it two. A 5% tax is 10% halved.

PART A: TENTHS AND HUNDREDTHS

1. $0.1 \times 640 =$ _____.
2. $0.01 \times 640 =$ _____.
3. A 5% tax is 10% halved. On a price of \$86.00 the tax is \$_____.
4. $0.01 \times 1250 =$ _____.

PART B: ESTIMATE, THEN PROVE

5. A cart holds three items priced \$12.85, \$7.40 and \$19.95. Estimate the subtotal using friendly numbers, then calculate it exactly and say how far off your estimate was.

SHOW YOUR WORK

Answer: _____

6. That same cart is taxed at 5%. Find the tax and the final total.

SHOW YOUR WORK

Answer: _____

7. A receipt shows a final total of \$31.50 after a 5% tax was added. What was the subtotal before tax?

SHOW YOUR WORK

Answer: _____

PART C: WHICH STRATEGY?

8. Bilal wants 5% of \$64.00 in his head. Which strategy gets there quickest?
- Ⓐ Find 10% first, which is \$6.40, then halve it Ⓑ Multiply 64 by 0.5 Ⓒ Divide 64 by 5
9. Mahina estimates the taxed total of a \$47.60 cart at 5% as "about \$50". Is that a fair estimate?
- Ⓐ Yes, the exact taxed total is \$49.98, so \$50 is very close
- Ⓑ No, the exact taxed total is under \$45 Ⓒ No, the exact taxed total is over \$55

PART D: SETTLE AN ARGUMENT

10. A classmate says that taxing each item separately gives a different total than taxing the subtotal at the end. Use the cart from Part B to decide whether they are right, and explain what is really going on.

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ANSWER KEY

1. 64
2. 6.4
3. \$4.30
4. 12.5
5. Estimating with 13, 7 and 20 gives about \$40.00. The exact subtotal is \$40.20, so the estimate is \$0.20 low.
6. The tax is \$2.01 and the final total is \$42.21.
7. \$30.00, because \$30.00 with 5% added comes to \$31.50.
8. A) Find 10% first, which is \$6.40, then halve it
9. A) Yes, the exact taxed total is \$49.98, so \$50 is very close
10. They are not right. Taxing each item and then adding gives the same total as adding first and taxing once, because multiplying each part by 1.05 and adding is the same as adding and then multiplying by 1.05. Checking with the Part B cart: \$12.85, \$7.40 and \$19.95 taxed separately are \$13.49, \$7.77 and \$20.95, which add to \$42.21, the same total. A strong answer also notes that rounding each item to the nearest cent can shift the total by a penny.

TEACHER NOTES

Extension beyond the grade-level expectation: Part B question 3 runs the tax backwards from a receipt, and Part D asks students to reason about the distributive property rather than apply a procedure. The estimate-then-compare structure in Part B question 1 is the habit the expectation is really after.