

Elmo makes N sandwiches for a fundraiser. For each sandwich he uses B globs of peanut butter at 4¢ per glob and J globs of jam at 5¢ per glob. The cost of the peanut butter and jam to make all the sandwiches is \$2.53. Assume that B , J , and N are positive integers with $N > 1$. What is the cost of the jam Elmo uses to make the sandwiches?

- (A) \$1.05 (B) \$1.25 (C) \$1.45 (D) \$1.65 (E) \$1.85

2006 AMC 10 B, Problem #22—

2006 AMC 12 B, Problem #14—

“What is the total cost in terms of N , B , and J ?”

Solution (D) The total cost of the peanut butter and jam is $N(4B+5J) = 253$ cents, so N and $4B + 5J$ are factors of $253 = 11 \cdot 23$. Because $N > 1$, the possible values of N are 11, 23, and 253. If $N = 253$, then $4B + 5J = 1$, which is impossible since B and J are positive integers. If $N = 23$, then $4B + 5J = 11$, which also has no solutions in positive integers. Hence $N = 11$ and $4B + 5J = 23$, which has the unique positive integer solution $B = 2$ and $J = 3$. So the cost of the jam is $11(3)(5¢) = \$1.65$.

AMC 10 Difficulty: Hard

AMC 12 Difficulty: Medium-hard

NCTM Standard: Measurement Standard: apply appropriate techniques, tools, and formulas to determine measurements

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