# Turkey Day

I am getting ready for Thanksgiving and need some help desperately! I would like some advice on cooking my turkey.

I bought a 16 1/2 pound turkey. The cookbook says to cook the turkey for 20 minutes per pound if it is unstuffed and 25 minutes per pound if the turkey is stuffed. I plan on having a stuffed turkey.

If I want to eat at 1:00 p.m., what time should I put the turkey in? Oh, yes, the cookbook says to let the turkey stand for 10 minutes after coming out of the oven.

**Grade Levels 6 - 8**

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## Context

I have been trying to think of authentic problems to use in my sixth grade classroom. Thanksgiving seemed like a good opportunity. As happens to me often, this problem turned out to be more interesting than I had anticipated. My first period class asked for calculators to help them with some of the computation. Naturally, I readily supplied them. What a mess my students got into with the calculators! As it happens when they divided, the quotient came out to be a decimal number of hours. Some students creatively dealt with the decimal hours and converted them to minutes, but most had trouble interpreting the remainder as part of an hour and not the number of minutes. Others went back to the hand method and were more successful (a nice example of when a calculator is not helpful). The other difficult part was subtracting the number of hours and minutes from 1:00 p.m. We worked on regrouping measurements after the problem and that work helped when we regrouped with fractions.

## What This Task Accomplishes

This task asks students to work with time - a very important, but difficult concept - in an authentic context. Students have to interpret remainders in division and think about regrouping measurements in subtraction. This problem also looks to see what students make reasonable decisions of when to estimate.

## What the Student Will Do

Some students asked for calculators and found them difficult to work with in this problem because of the decimal remainder. Other students worked the calculations by hand. They had to deal with the 1/2 pound through reasoning because they had not remembered multiplying by fractions. Some students started a long list of times subtracting 25 minutes for each pound from 1:00 p.m.

Others could do part of the problem using the algorithms, but made a clock for figuring out the

time.

## Time Required for Task

45 minutes

## Interdisciplinary Links

This task could be linked to units on health, cooking and the holidays.

## Teaching Tips

Warn students that ask for a calculator that it may be difficult to use the information they get. But, I would not restrict the use of them - a really good discussion came out of the use of calculators and how to interpret decimal remainders when dealing with time.

## Suggested Materials

- Paper
- Pencil

## Possible Solutions

16 1/2 pounds x 25 minutes = 412 1/2 minutes

412 1/2 minutes + 10 minutes cooling time / 60 = 7 hours 2 1/2 minutes

(At this point, they can round to 7 hours or 7 hours 3 minutes.)

1:00 p.m. - 7 hours 2 1/2 minutes = 5:57 1/2

(Here, it is reasonable to say to put in the turkey at about 6:00 a.m.)

## Benchmark Descriptors

**Novice**
This student used inappropriate concepts to find the solution. S/he thought that if they multiplied the pounds by the minutes s/he would get the time to put the turkey in the oven. There is no explanation of the solution.

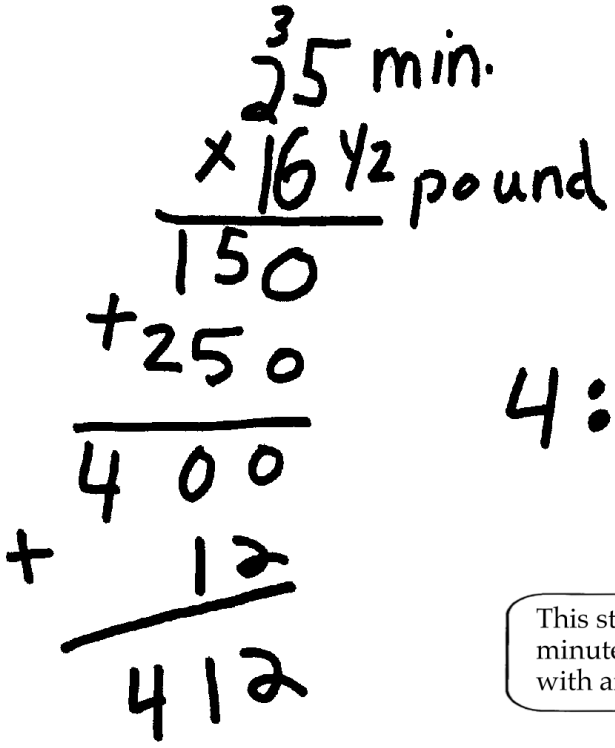
**Apprentice**
This student's strategy is partially useful. S/he has trouble interpreting the decimal remainder as minutes and also has trouble subtracting time (although, making 1:00 p.m. 13:00 is a good idea). There is some evidence of mathematical reasoning, but the student could not carry out

the mathematical procedures.

**Practitioner**
This student has a broad understanding of the problem. S/he uses a strategy that leads to a reasonable solution. Rounding the cooking time to the nearest hour is reasonable in this problem. It takes a little time to figure the order of his/her steps, but they are all correct. For example s/he finds the time it takes to cook a 16 pound turkey then adds on the cooling time then adds the extra 13 (and it is reasonable to drop the 1/2 minute) minutes to cook the extra 1/2 pound of turkey. Because his/her computation is labeled, it is easy to follow his/her reasoning.

**Expert**
This student shows a deep understanding of the problem including the ability to identify the appropriate mathematical concepts necessary to solve the problem. The student also writes an equation that generalizes the process for all cases. S/he also employs refined and complex reasoning by stating that it takes 4/5 as long to cook an unstuffed bird as a stuffed bird.

## Novice




Minimal math language is used.

This student confuses minutes needed for baking with an actual time.

## Apprentice

I multiplied 16.5 (which is the weight of the turkey) by 25 (which is the time to cook turkey with stuffing.) equals 412.5 than I + 10 minutes devided 60 min. by 422.5 and got 7.04 - so the time has to be 7 hours and 4 minutes ?

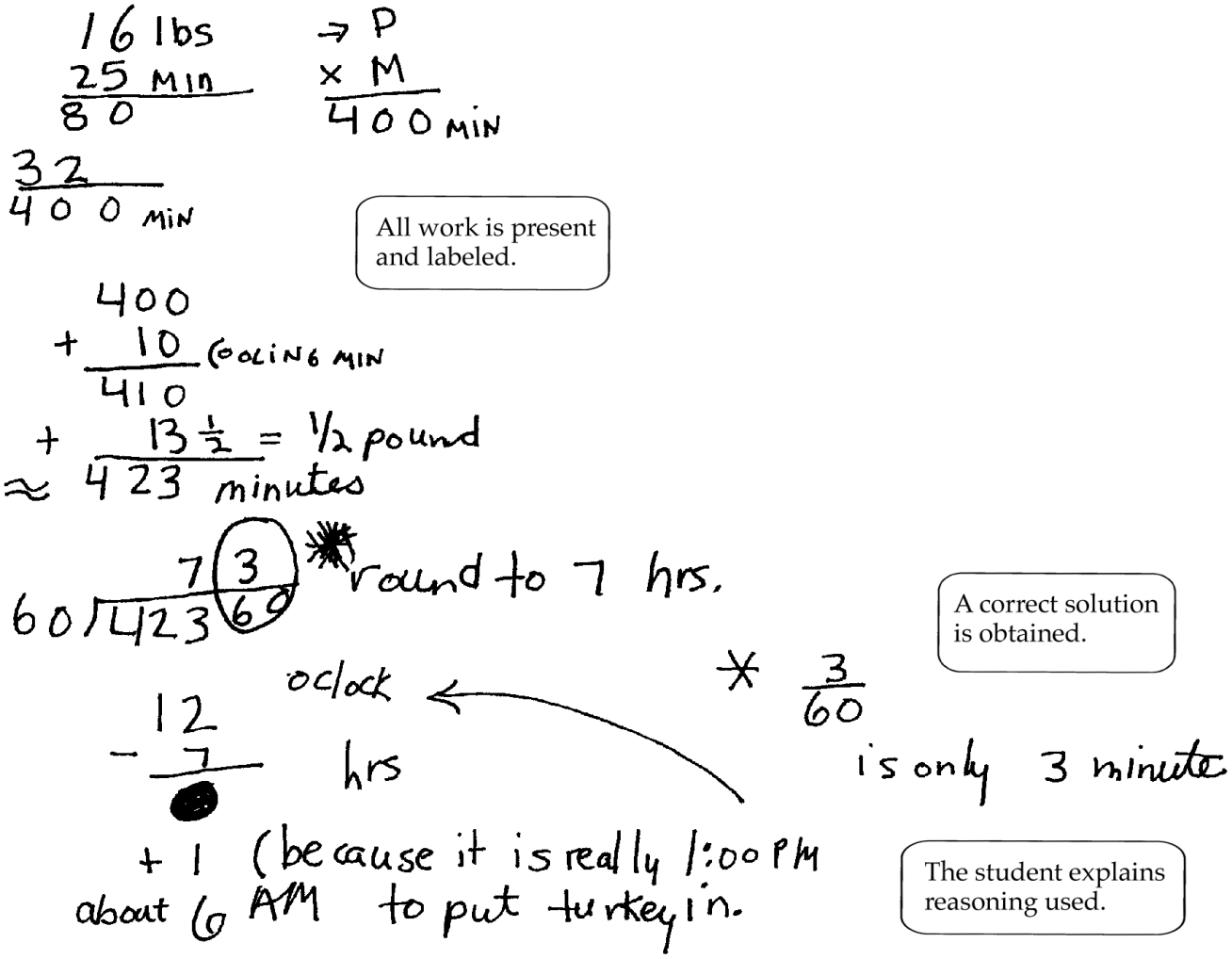
The student has difficulty interpreting the remainder.

This solution is partially useful.

The student is challenged by subtraction time, although this was a good idea.

13:00
7:04
5:96 or 6:36 Am

## Practitioner



**Expert**

This approach is direct and efficient.

To figure out how to cook a turkey
I first said how do I use the
information givin to me. You have
to multiply 16½ by 25 to determine
how long you have to cook the
turkey then add 10 for how long
it has to sit You have to divide
it by 60 so you get the answer

in hours instead of minutes
then subtract that from the
time you want it ready.

Reasoning is explained.

or

**Expert**

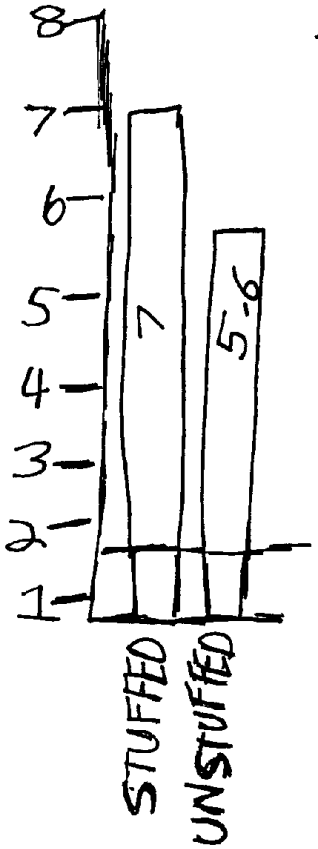
or

$W - (L_{lbs} \times M_{minutes\ per\ pound} + S_{thinking\ time}) \div 60 = T_{time\ to\ put\ in}$

The student generalizes the solution.

antes Interreply

By the way, you should cook it at 6 AM if you. Use this fomula and the information givin.




This graph shows that an unstuffed turkey is cooked 4/5 as long as cooked stuffed turkey.

The student makes a mathematical comparison/observation.