



## Problem of the Week

### Problem A and Solution

#### Piling Wood

#### Problem

The Taylor family heats their home with wood. They recently got a large delivery of cut logs which were left in a pile on their driveway. Janelle and Alphonso carry logs from the pile and stack them in the woodshed. In one trip, Janelle can carry 4 logs at a time and Alphonso can carry 3 logs at a time. They each take the same amount of time to carry logs from the pile, stack them in the woodshed, and walk back to the pile.

- If they each take as many logs as they can on each trip from the pile to the woodshed, how many logs have Janelle and Alphonso stacked after making 10 trips from the pile to the woodshed?
- When Janelle and Alphonso started, there were 200 logs in the pile. How many trips from the pile to the woodshed do they have to take in order to move all the logs?
- It takes approximately 30 seconds for Janelle and Alphonso to carry logs from the pile, stack them in the woodshed, and return to the pile. Approximately how many minutes does it take them to stack all of the logs in part (b)?
- On the last trip, Janelle and Alphonso carry the same number of logs. If they each take as many logs as they can on their earlier trips, how many logs do they each carry on the last trip?

#### Solution

- In total, Janelle and Alphonso carry  $4 + 3 = 7$  logs per trip from the log pile to the woodshed. This means they carry  $7 \times 10 = 70$  logs in 10 trips.
- To figure out how many trips it takes to move all the logs, we could skip count by 7s until we get to or pass 200:

7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84, 91, ...

Then we would count how many 7s it takes to get past 200 and we would see that it is 29.

Alternatively, we know from part (a) that after 10 trips, they will have moved 70 logs. So, after 20 trips they will have moved 140 logs, and after 30 trips they will have moved 210 logs. If we count backwards from 210, we can



determine that after 29 trips they will have moved 203 logs, and after 28 trips they will have moved 196 logs. Therefore, we can conclude that it takes 29 trips to move all the logs.

Another way to calculate this is to divide 200 by 7 to obtain 28 remainder 4. Since there is a remainder after 28 trips, then it will take one more trip to move all the logs. Therefore, we can conclude that it takes 29 trips to move all the logs.

- (c) Since each trip takes approximately 30 seconds, then 2 trips take approximately 1 minute. This means that 28 trips would take approximately 14 minutes. Therefore, 29 trips would take approximately 14 and a half minutes.
- (d) After 28 trips, they have moved  $28 \times 7 = 196$  logs. This means there are  $200 - 196 = 4$  logs left for their last trip. Since Janelle and Alphonso carry the same number of logs on their last trip, then they each must carry 2 logs.