



Primary PoW Packet

Counting Shells

Problem 4955 • <https://www.nctm.org/pows/>

Welcome!

This packet contains a copy of the problem, the “answer check,” sample solutions and some teaching suggestions. The text of the problem is included below. A print-friendly version is available using the “Print” link from the blue-shaded box on the problem page.

Standards

In **Counting Shells** students are asked to determine how many shells Jack has given information about how he counts them. If your state has adopted the [Common Core State Standards](#), this alignment might be helpful:

Grade 1: Number & Operations in Base Ten

Extend the counting sequence.

Grade 2: Number & Operations in Base Ten

Count within 1000; skip-count by 5s, 10s, and 100s.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.

The Problem

Counting Shells

Jack has a lot of shells. He has more than 40 but less than 60. When he counts them by twos he has one left over. When he counts them by fives he has none left over.

The number of shells is more than half of 100.

How many shells does Jack have?



Answer Check

After students submit their solution, they can choose to “check” their work by looking at the answer that we provide. Along with the answer itself (which never explains how to actually **get** the answer) we provide hints and tips for those whose answer doesn’t agree with ours, as well as for those whose answer does. You might use these as prompts in the classroom to help students who are stuck and also to encourage those who are correct to improve their explanation.

Jack has 55 shells.

If your answer does **not** match ours, did you

- draw a picture?
- use a manipulative?
- draw a number line
- talk in your group?

If your answer **does** match ours, did you

- explain?
- help anyone in your group?

Our Solutions

Method 1: Notice/Wonder

Our group read the problem wrote what we noticed:

- Jack has shells.
- He has more than 40.
- 41 is more than 40.
- He has less than 60.

- 59 is less than 60.
- When he counts by 2 there's one left over.
- The number of shells is an odd number.
- When he counts by 5 there's none left over.
- The number of shells is a multiple of 5.
- The number of shells is more than half of 100.
- The number of shells is 51 or more.

We talked about what the clues told us. From the first clues we knew the number of shells would be one of these numbers:

41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59

The clue about 5 helped us have a shorter list:

45, 50, 55

Since 50 is an even number we knew it was either:

45 or 55

The last clue that the number is more than half of 100 helped us decide. 45 is less than 50 and so that meant that Jack has 55 shells!

Method 2: Make a Table

Our group used the clues and made a table:

between 40 & 60	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
÷ by 5					45					50					55				
÷ by 2 w/ R of 1					45										55				
more than 1/2 of 100															55				

Jack has 55 shells.

Method 3: Draw a Picture

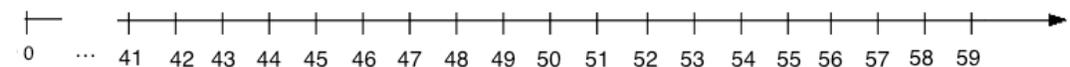
Our group drew a picture to think about what the clues. We listed the numbers between 40 and 60. We crossed out all of the even numbers. We crossed out the numbers that weren't multiples of 5. Only 45 and 55 were left but then we thought about which ones were more than 1/2 of 100 (or more than 50).

41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59
~~41~~ ~~42~~ ~~43~~ ~~44~~ 45 ~~46~~ ~~47~~ ~~48~~ 49 ~~50~~ ~~51~~ ~~52~~ ~~53~~ ~~54~~ 55 ~~56~~ ~~57~~ ~~58~~ 59
~~41~~ ~~42~~ ~~43~~ ~~44~~ 45 ~~46~~ ~~47~~ ~~48~~ ~~49~~ ~~50~~ ~~51~~ ~~52~~ ~~53~~ ~~54~~ 55 ~~56~~ ~~57~~ ~~58~~ 59

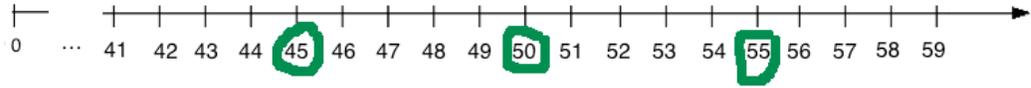
Our answer was that Jack has 55 shells.

Method 4: Use a Number line

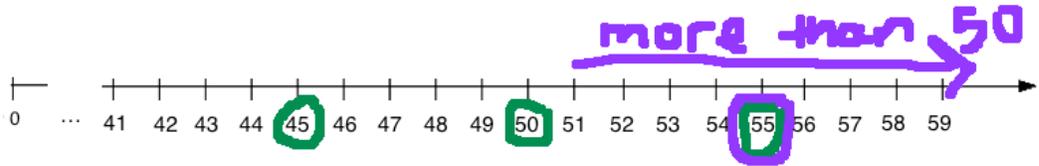
We used a number line to think about the clues. First we thought about the numbers that are more than 40 but less than 60.



Next we circled the numbers that you get when you count by 5 and have nothing left over.



If we count by twos only 45 or 55 have 1 left over but 50 does not have anything left over. The last clue tells us that 55 is the number of shells that Jack has because it's the only number that is more than half of 100.



Jack has 55 shells.

Teaching Suggestions

This problem has not yet been discussed during any of our online courses. If you try it with your students and have a short story to tell about

- how you prepared/planned to present the problem to your students
- what happened when you used it with students
- what classroom environment did you use? individual, pairs, groups, whole class?
- something you noticed about your students' approaches to the problem
- something you wondered about your students' understandings or misunderstandings

We hope this information is useful in helping you make the most of the Primary Problems of the Week in the Library. Please let me know if you have ideas for making them more useful.

<https://www.nctm.org/contact-us/>