

## Illustrative Mathematics

### 4.NBT Mental Division Strategy

#### Alignments to Content Standards

- [Alignment: 4.NBT.B.6](#)

#### Tags

- *This task is not yet tagged.*

Jillian says

*I know that 20 times 7 is 140 and if I take away 2 sevens that leaves 126. So  $126 \div 7 = 18$ .*

- Is Jillian's calculation correct? Explain.
- Draw a picture showing Jillian's reasoning.
- Use Jillian's method to find  $222 \div 6$ .

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#### Commentary

This task would be ideal to help students develop mental strategies to think about division during instruction. Jillian's strategy is often referred to as using "compatible numbers." Jillian is using a relationship that she can easily find: 140 divided by 7 is 20 or 20 sets of 7 is 140. The numbers 140 and 7 are often called "compatible" because 14 is a multiple of 7 so Jillian could strategically use this fact to reason through her problem. This task could also be extended to ask students for other mental math strategies to find 126 divided by 7. Students might reason that 10 sets of 7 is 70 and 8 sets of 7 is 56. Since  $70 + 56$  is 126, there are 18 sets of 7 in the number 126.

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#### Solutions

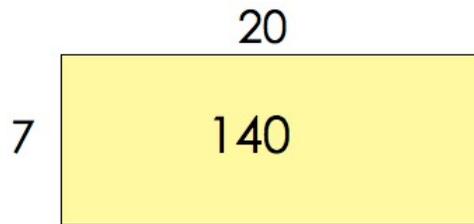
Solution: 1

- Jillian's reasoning is correct. She has found  $20 \times 7 = 140$  and  $2 \times 7 = 14$ . This means that

$$\begin{aligned} 18 \times 7 &= (20 - 2) \times 7 \\ &= (20 \times 7) - (2 \times 7) \\ &= 140 - 14 \\ &= 126. \end{aligned}$$

The second equality uses the distributive property. These equations tell us that  $126 \div 7 = 18$ .

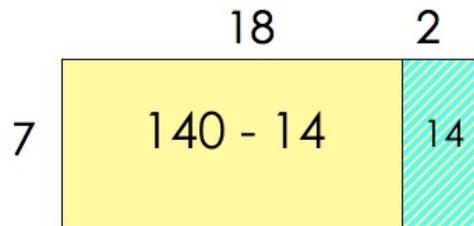
- Jillian's initial idea of dividing 140 by 7 is represented here:



From there, Jillian decomposes the 20 sevens into 18 sevens and 2 sevens:



Lastly, Jillian recognizes that if the area of both rectangles combined would be 140, then she must subtract off the 2 extra sevens she used to get 140:



c. We have  $40 \times 6 = 240$  and  $3 \times 6 = 18$ . So

$$\begin{aligned}
 37 \times 6 &= (40 - 3) \times 6 \\
 &= (40 \times 6) - (3 \times 6) \\
 &= 240 - 18 \\
 &= 222.
 \end{aligned}$$

The second line uses the distributive property of multiplication.



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