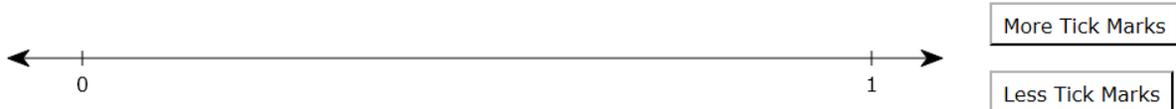


Mr. Edmunds shared 12 pencils among his four sons as follows:

- Alan received  $\frac{1}{3}$  of the pencils.
- Bill received  $\frac{1}{4}$  of the pencils.
- Carl received more than 1 pencil.
- David received more pencils than Carl.

Part A

On the number line, represent the fraction of the total number of pencils that was given to both Alan and Bill combined. Use the buttons on the right to increase or decrease the number of equal sections on the number line.

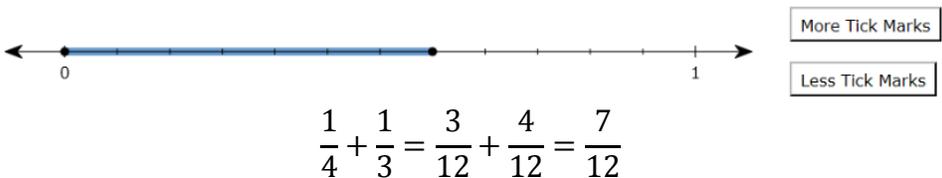


Part B

What fraction of the total number of pencils did Carl and David **each** receive? Justify your answer.

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Grade 5	Mr. Edmund's Pencil Box
Item Type	Type III – 3 point
Evidence Statement	5.D.1 with content scope of 5.NF <b>5.D.1:</b> Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 5, requiring application of knowledge and skills articulated in the Grade 5 PBA Evidence Statement Table.
Most Relevant Standards for Mathematical Content	<b>5.NF.2:</b> Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect</i>

	<p>result <math>2/5 + 1/2 = 3/7</math>, by observing that <math>3/7 &lt; 1/2</math>.</p> <p><b>5.NF.4a:</b> Interpret the product <math>(a/b) \times q</math> as <math>a</math> parts of a partition of <math>q</math> into <math>b</math> equal parts; equivalently, as the result of a sequence of operations <math>a \times q \div b</math>. For example, use a visual fraction model to show <math>(2/3) \times 4 = 8/3</math>, and create a story context for this equation. Do the same with <math>(2/3) \times (4/5) = 8/15</math>. (In general, <math>(a/b) \times (c/d) = ac/bd</math>.)</p> <p>These standards are major content in the grade based on the PARCC Model Content Frameworks.</p>
<p>Most Relevant Standards for Mathematical Practice</p>	<p>Students may use the technology-enabled number line strategically by creating the correct spacing in the intervals (MP.5). In addition, many students may use the number line again to address Part B, although students may find other ways to reason abstractly and quantitatively with that context (MP.2). Part B is structured in a novel way so students will have to make sense of the problem, and then persevere to find both fractions (MP.1).</p>
<p>Item Description and Assessment Qualities</p>	<p>This task requires students to apply solution strategies based in 5.NF. Fifth grade students build upon previous understandings of fractions to add fractions with unlike denominators and multiply fractions by whole numbers. This multi-part item asks students to persevere in that work to answer an open-ended question where the solution process for Part B is not immediately obvious; but, there is enough scaffolding for students to successfully demonstrate their ability to work with fractions to solve problems.</p> <p>Students use a number line as a tool to create a representation of the solution to an addition problem. Students may also choose to use the representation as a tool to solve Part B. The response for Part A is technology-enhanced so that it can be electronically scored. Unlike traditional multiple choice, it is difficult to guess the correct answer or use a choice elimination strategy.</p>
<p>Scoring Information</p>	<p>Task is worth 3 points. Task can be scored as 0, 1, 2, or 3. Scoring consists of 1 modeling component worth 3 points.</p> <p><u>Part A:</u> 1 point – machine scored.</p> <ul style="list-style-type: none"> <li>1 point for correctly representing the fraction <math>\frac{7}{12}</math> on the number line.</li> </ul> <p>Sample Response:</p>  <p style="text-align: center;"><math>\frac{1}{4} + \frac{1}{3} = \frac{3}{12} + \frac{4}{12} = \frac{7}{12}</math></p> <p><u>Part B:</u> 2 points – hand scored</p>

- 1 point is earned for formulating the problem.

For example: Alan and Bill receive 7 of the pencils, therefore Carl and David received the rest of the 12 pencils. They received  $12 - 7 = 5$  pencils combined. Since David received one more pencil than Carl, then David received 3 pencils and Carl received 2 pencils.

- 1 point is earned for interpreting the results.

For example: To express these quantities as fractions of the whole, then Carl received  $\frac{2}{12}$  and David received  $\frac{3}{12}$  of the pencils in the box.

NOTE: Students are not penalized for not writing fractions in lowest terms.

NOTE: If students show how they got the answer of  $\frac{7}{12}$  in Part A in the answer box for Part B, that work will not be scored as the directions do not ask for such an explanation.

Task score: The task score is the sum of the points awarded in Part A and Part B.