



Sample Mathematics Item: Grade 4

“Three Friends’ Beads”

November 2013

Ms. Morales has a bag of beads.

- She gives Elena 5 beads.
- She gives Damian 8 more beads than Elena.
- She gives Trish 4 times as many beads as Damian.

Ms. Morales then has 10 beads left in the bag.

Part A

How many beads did Damian and Trish each receive? Show or explain how you arrived at each answer.

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Part B

How many beads were in Ms. Morales' bag before any beads were given to students?

beads

Grade 4	Three friends' beads
Type	Type III - 3 points
Evidence Statement	<p>4.D.1: Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 4 requiring application of knowledge and skills articulated in the Evidence Statements on the PBA (excludes Reasoning Evidence Statements).</p> <p>Clarification: i) Tasks may have scaffolding if necessary in order to yield a degree of difficulty appropriate to Grade 4.</p>
Most Relevant Standards for Mathematical Content	<p>4.OA.A: Use the four operations with whole numbers to solve problems.</p> <ol style="list-style-type: none"> 1. Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. 2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. 3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. <p>This standard is major content in the grade based on the PARCC Model Content Frameworks.</p>
Most Relevant Standards for Mathematical Practice	<p>Students must reason abstractly and quantitatively with the context in order to understand the relationships given in the question (MP.2). Creating this multi-step solution path will require students to create an effective model of the situation (MP.4), but the question allows for students to create whatever models they are most comfortable employing (e.g., some students may create a series of expressions, other student may choose to diagram the situation).</p>
Item Description and Assessment Qualities	<p>This task requires students to apply solution strategies based in 4.OA. Fourth grade students have a strong foundation in using the four operations with whole numbers. Students will have to wrestle with these relationships without much scaffolding so the numbers in the item are not too complex to ensure the task is still grade appropriate. The procedural skills are an important element of the solution path; however, the numbers were carefully chosen to ensure that application was the primary focus of the task.</p>

	<p>There are a wide variety of solution processes that students may use to receive full credit. Unlike traditional multiple choice, it is difficult to guess the correct answer or use a choice elimination strategy.</p>
<p>Scoring Information</p>	<p>Scoring Rubric</p> <p>Task is worth 3 points. Task can be scored as 0, 1, 2, or 3.</p> <p>Scoring consists of 3 points for modeling.</p> <ul style="list-style-type: none"> • 2 points are earned for fully describing the steps necessary to find the number of beads that Damian and Trish each received. [Note: 1 point is earned for only describing or showing the steps necessary to find the number of beads Damian or Trish had instead of providing the information for both.] <p>For example: Elena had 5 beads so Damian has $5 + 8 = 13$ beads. Trish has $4 \times 13 = 52$ beads. Altogether there are $5 + 13 + 52 = 70$ beads. I know that 80 is ten more than 70, so there were 80 total beads.</p> <ul style="list-style-type: none"> • 1 point for calculating the final number of beads correctly. Total number of beads: 80 <p>Note: Students may receive points for their work in Part B if answers for Part A are correctly added and then added to 10 to find the total number of beads.</p>