A

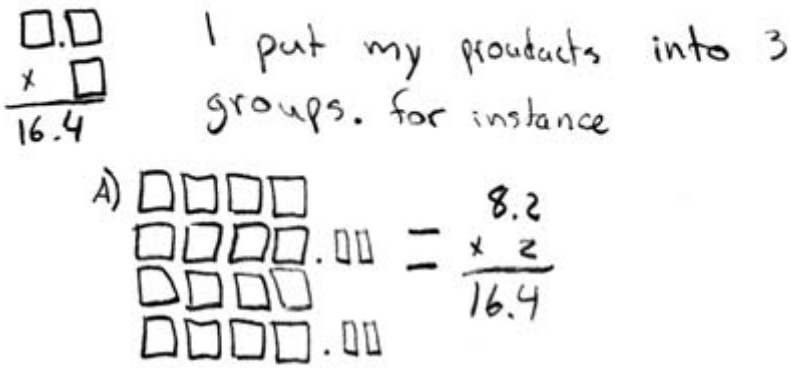
Exemplar Task

Jasmine and Luciano discovered some ancient mathematical problems where only the products could be seen. They wondered if it was possible to use the clues they had been given to figure out the original questions. For each of the following questions use base-ten blocks.

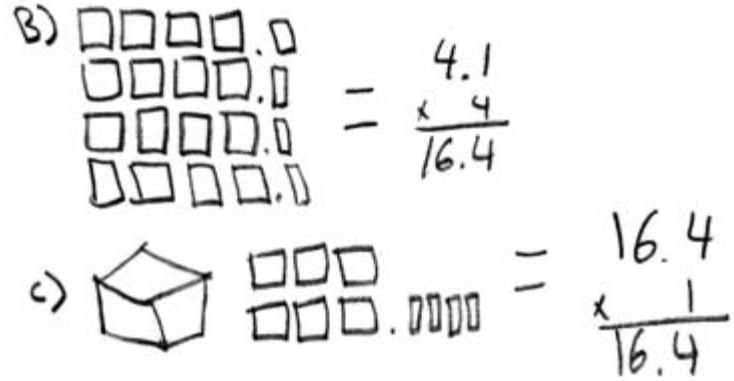
1. Find the numbers which, when multiplied, give the products shown.
   Use the blank space to show your work and to show any other combinations that would give you the same product.
   [Note: Do not put more than one digit inside a 'box']

8.2	4.1	16.4
x 2	x 4	x 1
16.4	16.4	16.4

2. Explain what you did to find your solutions.



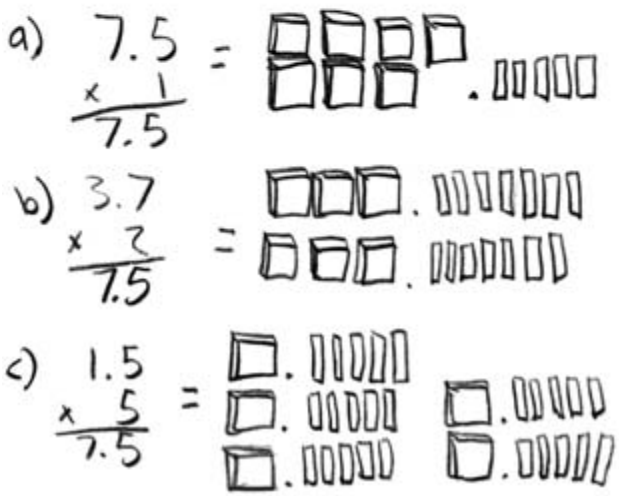
B



C

3. Here is another problem Luciano and Jasmine found.
Use this information to find the numbers which, when multiplied, give the products shown.
Use the blank space to show your work and to show any other combinations that would give you the same product.

7.5	3.7	1.5
x 1	x 2	x 5
7.5	7.5	7.5



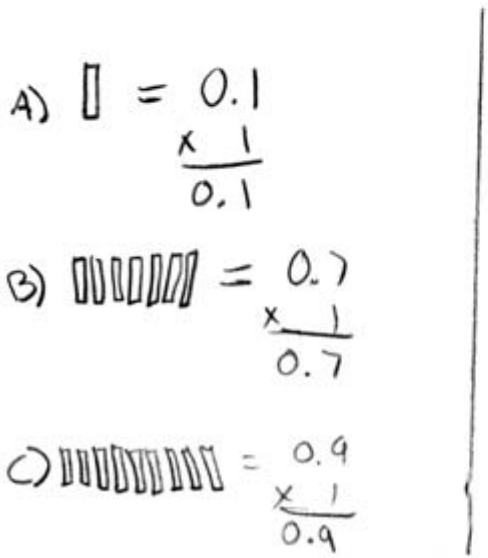
I put my products into 3 groups and then drew the pictures of the base ten blocks.

D

4. Do you think some products can only be found in **one way**? Give reasons to justify your thinking.

(You don't have to use all of the boxes in the product)

0.1	0.7	0.9
x 1	x 1	x 1
0.1	0.7	0.9



These numbers can only be found in one way because they are all prime numbers and they are uneven.

E

5. Is it possible to find a product that can only be found in **two ways**?
Investigate showing all your work in the space below.
(You don't have to use all of the boxes in the product)

1 . 1	3 . 5
x 4	x 2
4 . 4	7 . 0

A) 1.1 × 4 = 4.4

I know this because 4.4 can be found by 1.1 × 4 and 2.2 × 2. Those are the only ways.

B) 3.5 × 2 = 7.0

I know this because 7.0 can only be found by 3.5 × 2 and 7.0 × 1.

F

6. Jasmine and Luciano's classmates began to wonder if they could find a product that could be written in **four different ways** using the template shown below.

a) Use the template below to investigate the question.
[Note: Do not put more than one digit inside a 'box']

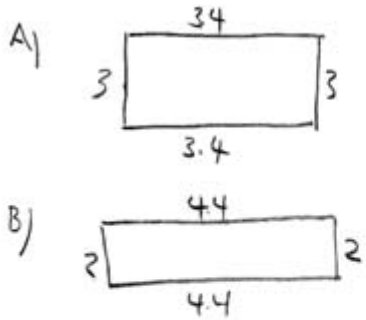
1 . 0	0 . 5	2 . 0	4 . 0
x 4	x 8	x 2	x 1
4.0	4.0	4.0	4.0

b) Explain how you found the answer to this question.

how I figured this out is I timed some numbers to get 4.0. If you take away the decimal, it would be 40 so things that go into 40 is what I put (10, 5, 20, 40).

G

7.a) Draw as many rectangles as you can with a perimeter of 12.8 cm.
Draw the rectangle such that one of the dimensions is always a whole number and the other dimension is not shorter than 1 unit.



b) Find the areas of the rectangles you have drawn.
What are some of the things you notice?

A) P = 3 + 3 + 3.4 + 3.4 = 12.8

B) P = 4.4 + 4.4 + 2 + 2 = 12.8

I noticed that my perimeters are the same.

Teacher's Notes

Problem Solving

– The student selects and applies an appropriate problem-solving strategy that leads to a partially complete and/or partially accurate solution (e.g., in question 5, uses illustrations to attempt to solve the problem, arriving at inaccurate solutions).

Understanding of Concepts

– The student demonstrates some understanding of processes and solutions involving place value and decimals by providing partial explanations and illustrations (e.g., in question 5, states, "I know this because 4.4 can be found by 1.1 x 4 and 2.2 x 2. Those are the only ways", and uses an illustration to support the statement).

Application of Mathematical Procedures

– The student uses computations and mathematical procedures that include some errors and/or omissions (e.g., in question 3, does not multiply correctly; in question 7, does not attempt to find the area).

Communication of Required Knowledge

– The student uses mathematical language and notation with some clarity to explain and justify responses to reverse-processing problems involving decimals (e.g., in question 1, "I put my prouducts into 3 groups"; in question 3, "I put my products into 3 groups and then drew the pictures of the base ten blocks"; in question 4, "These numbers can only be found in one way because they are all prime numbers and they are uneven").

Comments/Next Steps

– The student should expand his or her use of mathematical language to explain and justify his or her responses.
– The student should use base-ten blocks to find products with a given number of factors.
– The student needs to further develop his or her understanding of perimeter and area as well as explore the relationship between the dimensions (factors) and the area (product) of a rectangle.

What's the Question? Level 2, Sample 2

A

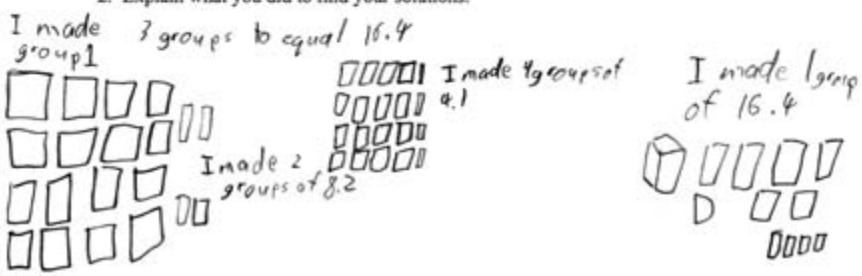
Exemplar Task

Jasmine and Luciano discovered some ancient mathematical problems where only the products could be seen. They wondered if it was possible to use the clues they had been given to figure out the original questions. For each of the following questions use base-ten blocks.

1. Find the numbers which, when multiplied, give the products shown.
   Use the blank space to show your work and to show any other combinations that would give you the same product.
   [Note: Do not put more than one digit inside a 'box']

8 . 2	4 . 1	1 6 . 4
X 2	X 4	X 1
1 6 . 4	1 6 . 4	1 6 . 4

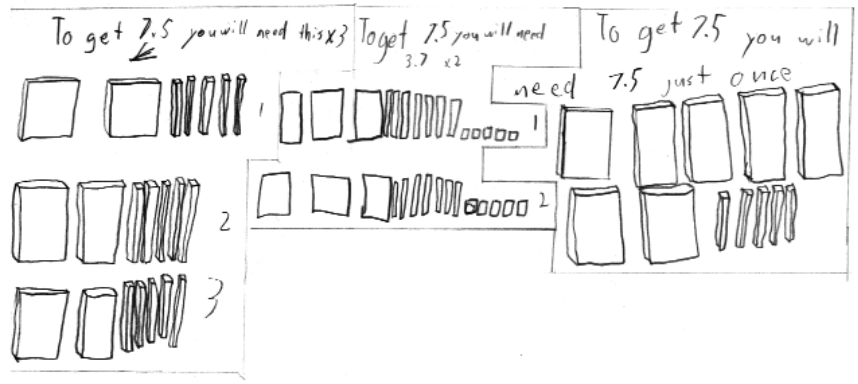
2. Explain what you did to find your solutions.



B

3. Here is another problem Luciano and Jasmine found.
   Use this information to find the numbers which, when multiplied, give the products shown.
   Use the blank space to show your work and to show any other combinations that would give you the same product.

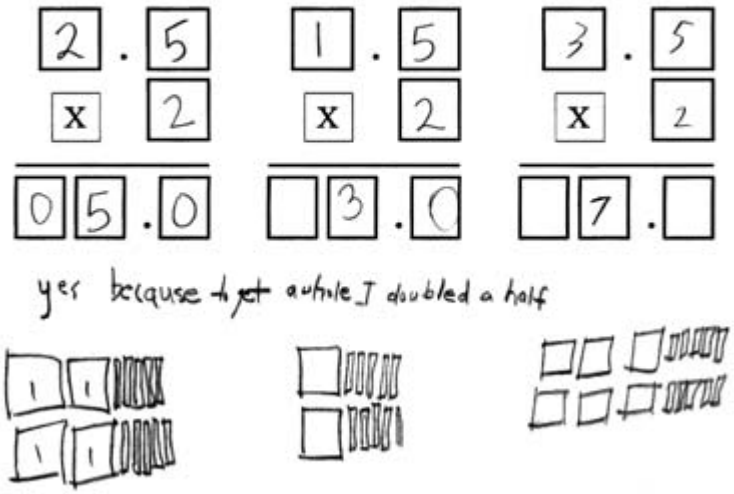
2 . 5	3 . 7 5	7 . 5
X 3	X 2	X 1
7 . 5	7 . 5	7 . 5



C

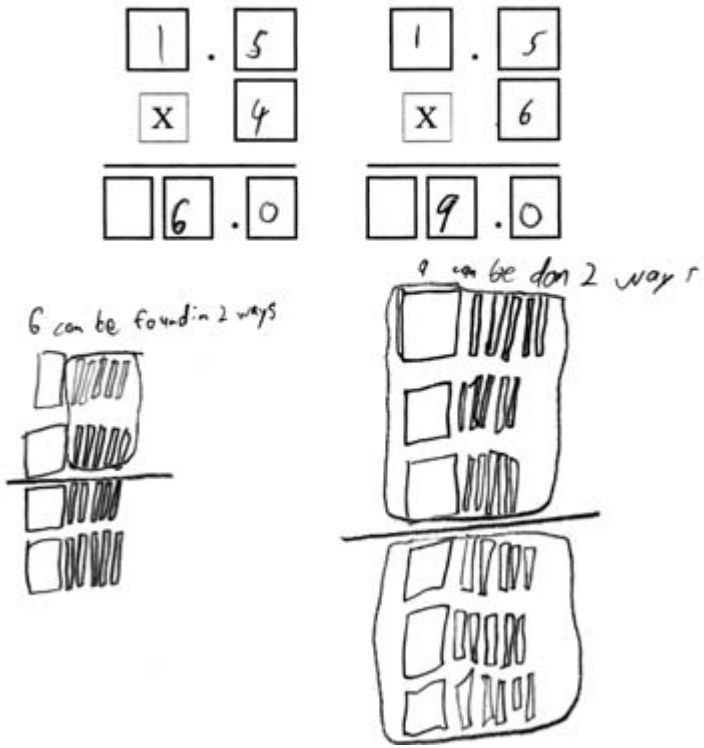
4. Do you think some products can only be found in **one way**? Give reasons to justify your thinking.

(You don't have to use all of the boxes in the product)



D

5. Is it possible to find a product that can only be found in **two ways**? Investigate showing all your work in the space below. (You don't have to use all of the boxes in the product)



E

6. Jasmine and Luciano's classmates began to wonder if they could find a product that could be written in **four different ways** using the template shown below.

a) Use the template below to investigate the question.
[Note: Do not put more than one digit inside a 'box']

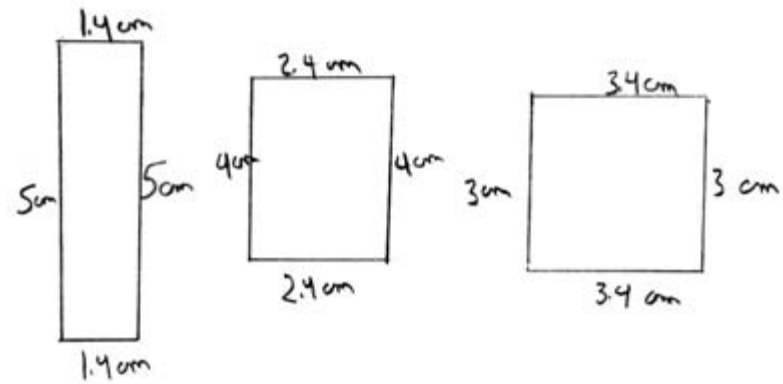
7.5	6.0	5.0
x 4	x 5	x 6
30.0	30.0	30.0

b) Explain how you found the answer to this question.

I tried different number sentences to get the answer and I found 3 ways for the answer.

F

7.a) Draw as many rectangles as you can with a perimeter of 12.8 cm.
Draw the rectangle such that one of the dimensions is always a whole number and the other dimension is not shorter than 1 unit.



b) Find the areas of the rectangles you have drawn.
What are some of the things you notice?

A=L×W
A=5cm×1.4cm
A=7cm²

A=L×W
A=2.4cm×4cm
A=9.6cm²

A=L×W
A=3.4cm×3cm
A=10.2cm²

Teacher's Notes

Problem Solving

– The student selects and applies an appropriate problem-solving strategy that leads to a partially complete and/or partially accurate solution (e.g., in question 6a, uses a guess-and-check strategy, trying different number sentences to get the solution).

Understanding of Concepts

– The student demonstrates some understanding of processes and solutions involving place value and decimals by providing partial explanations and illustrations (e.g., in question 5, provides illustrations to support two ways in which the products can be found, but provides no explanation of the second way).

Application of Mathematical Procedures

– The student uses computations and mathematical procedures that include some errors and/or omissions (e.g., in question 4, assumes that a whole answer is needed and proceeds to make an incorrect argument; in question 7, draws three rectangles but misses two possible solutions).

Communication of Required Knowledge

– The student uses mathematical language and notation with some clarity to explain and justify responses to reverse-processing problems involving decimals (e.g., relies heavily on illustrations to explain answers, providing only brief written statements to support them).

Comments/Next Steps

– The student should expand his or her use of mathematical language to explain and justify his or her responses.
– The student needs to further develop the use of base-ten blocks for solving problems related to products.
– The student should explore the relationship between the dimensions (factors) and the area (product) of rectangles, as well as the concept of perimeter.