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']

①	②	③
□ . □	8 . 2	4 . 1
X □	X 2	X 4
1 6 . 4	1 6 . 4	1 6 . 4

2. Explain what you did to find your solutions.

I picked these solutions because first I added them in my head then I simply multiplied them

□□□□□□□□ . □□ x 2

□□□□ . □ x 4

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.

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

① □□□□□□□ . □□□□□ x 1

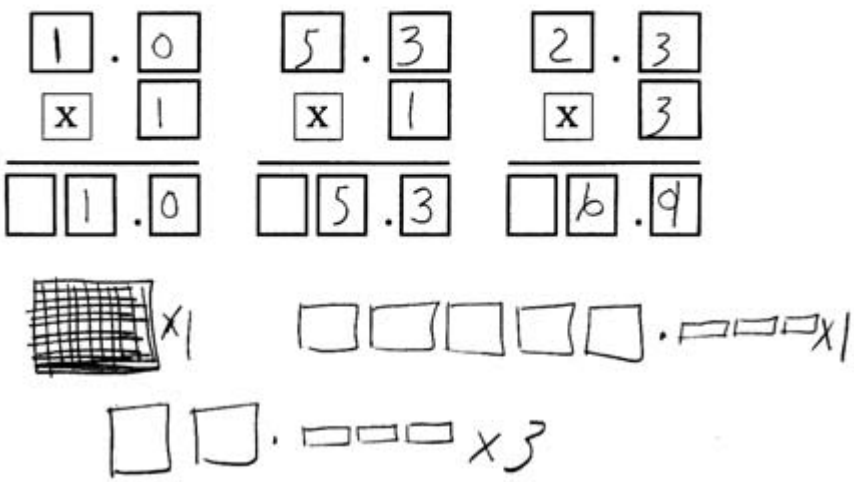
② □ . □□□□□ x 5

I picked these numbers because these were the only numbers I could think of and I thinks they work for this product.

C

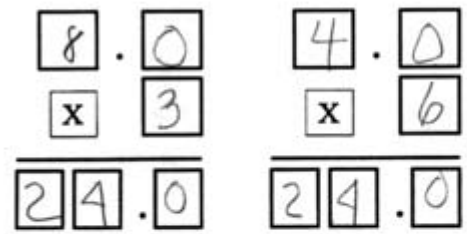
4. Do you think some products can only be found in **one way**? Give reasons to justify your thinking.

(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)



I figured out that 24 would work for my understanding and then figured out what goes into 24.

24 ÷ 3 = 8
24 ÷ 6 = 4

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']

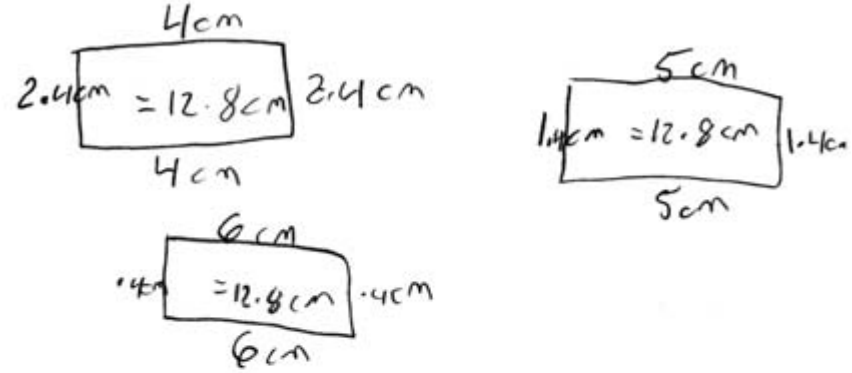
1 . 2	6 . 0	4 . 0	3 . 6
X 3	X 6	X 9	X 1
36	36	36	36

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

I got these answers by multiplying the bottom number to the top then figured out the rest so far. Now I got all four by crossing out 2 of the decimals and put in the right 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?

2.4 × 4 = 9.6 1.4 × 5 = 7.0 6 × .4 = 2.4

I noticed that the lower you go in the decimal of the perimeter the lower you area will be.

Teacher's Notes

Problem Solving

– The student selects and applies a problem-solving strategy that leads to an incomplete or inaccurate solution (e.g., in questions 2, 3, and 4, attempts to use diagrams to aid in problem solving; in question 4, uses diagrams that do not support the solutions provided).

Understanding of Concepts

– The student demonstrates a limited understanding of processes and solutions involving place value and decimals by providing limited explanations and illustrations (e.g., in questions 2 and 3, provides a few appropriate explanations to support his or her solutions: "I picked these solutions because first I added them in my head then I simply multiplyed them").

Application of Mathematical Procedures

– The student uses computations and mathematical procedures that include many errors and/or omissions (e.g., in question 4, shows three ways a product can be generated, but does not provide justifications; in question 7a, draws two of the rectangles accurately, but omits several other possible ones).

Communication of Required Knowledge

– The student uses mathematical language and notation with limited clarity to explain and justify responses to reverse-processing problems involving decimals (e.g., in question 3, "I picked these numbers because these were the only numbers I could think of and I think they work for this product"; in question 6b, focuses on the multiplication process, not the problem-solving process: "Now I got all four by crossing out 2 of the decimals and put in the right answer").

Comments/Next Steps

– The student should use base-ten blocks for solving problems involving decimals.
– The student needs to develop strategies required for reverse processing in order to solve problems.
– The student should develop his or her use of mathematical language for explaining and justifying his or her responses.

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	.
x 2	x 4	x
1 6 . 4	1 6 . 4	1 6 . 4

2. Explain what you did to find your solutions.

8.2
+8.2
16.4

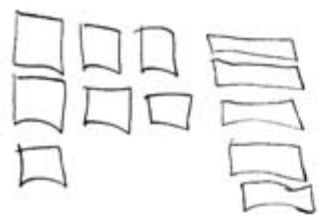
4.1
4.1
4.1
+4.1
16.4

I found my solutions by guessing in my head and then wrighting them down and trying them out.

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.

7 . 5	2 . 5	.
x 1	x 3	x
7 . 5	7 . 5	7 . 5



7.5
x 1
7.5

2.5
2.5
+2.5
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)

1.1	2.3	5.5
x 1	x 7	x 5
1.1	16.1	25.5

One reason why these products can only be made up in one way because the numbers the top digits are all the same uneven numbers and can only be divided by 1 or themselves and the numbers I multiplied by are uneven.

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)

6.2	3.1
x 3	x 6
18.6	18.6

6.2
x3
18.6

18.6÷3=6.2

3.1
3.1
3.1
3.1
3.1
+3.1
18.6

18.6÷6=3.1

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']

7.0	2.0	3.5	6.5
x 2	x 7	x 4	x 2
14.0	14.0	14.0	13.0
			+1.0
			14.0

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

7.0
+7.0
14.0

3.5
3.5
3.5
+3.5
14.0

2.0
2.0
2.0
2.0
2.0
2.0
2.0
14.0

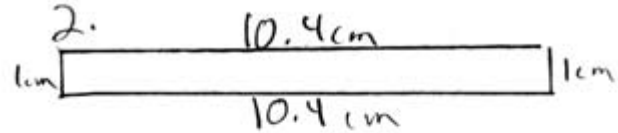
I guessed and checked everything.

6.5
+6.5
13.0
+1.0
14.0

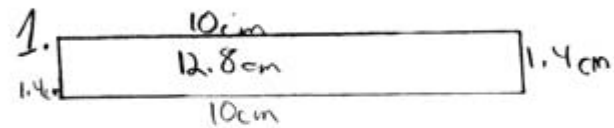
F

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.

2.



1.



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

1 A=LXW
A=10cmX 1.4cm
A=14.00cm²

2. A=LXW
A=10.4cmX 1cm
A=10.40cm²

10.4
X 1.0
00.0
10.40

Teacher's Notes

Problem Solving

– The student selects and applies a problem-solving strategy that leads to an incomplete or inaccurate solution (e.g., in question 6b, applies a portion of a guess-and-check strategy: "I guessed and checked everything", and includes an incorrect solution).

Understanding of Concepts

– The student demonstrates a limited understanding of processes and solutions involving place value and decimals by providing limited explanations and illustrations (e.g., in question 3, attempts to use an illustration and notation; makes only limited use of base-ten diagrams).

Application of Mathematical Procedures

– The student uses computations and mathematical procedures that include many errors and/or omissions (e.g., in question 7, attempts to draw a few of the required rectangles, but the measurements do not result in the required perimeter).

Communication of Required Knowledge

– The student uses mathematical language and notation with limited clarity to explain and justify responses to reverse-processing problems involving decimals (e.g., in question 2, "I found my solutions by guesseing in my head and then wrighting them down and trying them out").

Comments/Next Steps

– The student should use base-ten blocks for solving problems involving decimals.
– The student should develop strategies required for reverse processing in order to solve problems.
– The student should explore the relationship between the factors (dimensions) and the area (product) of a rectangle, as well as the concept of perimeter.
– The student should develop the use of mathematical language for explaining and justifying his or her responses.
– The student should refer to word charts and a dictionary for correct spellings.