

Reasoning and Problem Solving

Step 2: Related Calculations

National Curriculum Objectives:

Mathematics Year 3: (3C6) [Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables](#)

Mathematics Year 3: (3C7) [Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods](#)

Differentiation:

Questions 1, 4 and 7 (Reasoning)

Developing Use known multiplication facts to explain multiplication errors using multiples of 2, 4, 5 and 8 times by a multiple of 10. Pictorial support and complete related know fact used for support.

Expected Use known multiplication facts to explain multiplication errors using multiples of 2, 3, 4, 5 and 8 times by a multiple of 10.

Greater Depth Use known multiplication facts to explain multiplication errors using multiples of 2, 3, 4, 5, 6 and 8 times by a multiple of 10 or 100.

Questions 2, 5 and 8 (Problem Solving)

Developing Children use digit cards to create related number sentences using multiples of 2, 4, 5 and 8 times by a multiple of 10. Pictorial support and complete related know fact used for support.

Expected Children use digit cards to create related number sentences using multiples of 2, 3, 4, 5 and 8 times by a multiple of 10.

Greater Depth Children use digit cards to create related number sentences using multiples of 2, 3, 4, 5, 6 and 8 times by a multiple of 10 or 100.

Questions 3, 6 and 9 (Reasoning)

Developing Children use known multiplication facts to explain an answer using place value using multiples of 2, 4, 5 and 8 times by a multiple of 10. Pictorial support and complete related know fact used for support.

Expected Children use known multiplication facts to explain an answer using place value using multiples of 2, 3, 4, 5 and 8 times by a multiple of 10. Pictorial support included.

Greater Depth Children use known multiplication facts to explain an answer using place value using multiples of 2, 3, 4, 5, 6 and 8 times by a multiple of 10 or 100.

More [Year 3 Multiplication and Division](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

Related Calculations

1a. Mary has written some number sentences about a fact family, but she's made a mistake.

$$2 \times 4 = 8$$



$$20 \times 4 = 80$$

$$8 \div 2 = 4$$

$$80 \div 20 = 40$$

Find and explain her mistake.



R

Related Calculations

1b. Drew has written some number sentences about a fact family, but he's made a mistake.

$$5 \times 4 = 20$$



$$5 \times 40 = 200$$

$$20 \div 4 = 5$$

$$50 \div 4 = 200$$

Find and explain his mistake.



R

2a. Using the digit cards below, create five different multiplication or division sentences.

4

40

5

50

200

20

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$



PS

2b. Using the digit cards below, create four different multiplication or division sentences.

160

4

40

4

16

40

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$

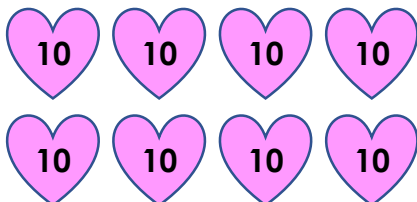


PS

3a. Eva says,



This array shows a multiplication fact that is related to 4×2 .



Do you agree? Explain why.



R

3b. Leon says,



This array shows a multiplication fact that is related to 5×2 .



Do you agree? Explain why.



R

Related Calculations

4a. Lily has written some number sentences about a fact family, but she's made a mistake.

$$3 \times 6 = 18$$

$$30 \times 6 = 180$$

$$180 \div 6 = 3$$

$$180 \div 3 = 60$$

Find and explain her mistake.



R

Related Calculations

4b. Daniel has written some number sentences about a fact family, but he's made a mistake.

$$8 \times 4 = 32$$

$$8 \times 40 = 320$$

$$32 \div 8 = 4$$

$$180 \div 80 = 4$$

Find and explain his mistake.



R

5a. Using the digit cards below, create five different multiplication or division sentences.

5

30

3

50

15

150



PS

5b. Using the digit cards below, create five different multiplication or division sentences.

240

3

30

80

24

8

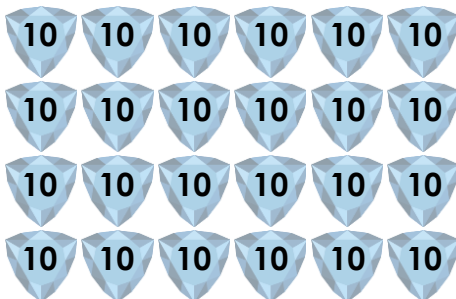


PS

6a. Sharon says,



This array shows a multiplication fact that is related to 4×6 .



Do you agree? Explain why.

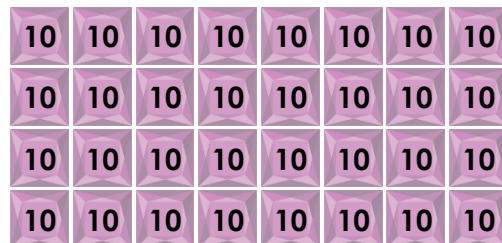


R

6b. Colin says,



This array shows a multiplication fact that is related to $320 \div 8$.



Do you agree? Explain why.



R

Related Calculations

7a. Fill in the blanks to find the mistake that Elena has made in her fact family.

$$6 \times \square = 48 \quad 80 \times 6 = \square$$

$$\square \div 8 = 60 \quad 700 \div \square = 6$$

Explain her mistake.



R

Related Calculations

7b. Fill in the blanks to find the mistake that Aaron has made in his fact family.

$$6 \times \square = 24 \quad 60 \times 4 = \square$$

$$\square \div 6 = 100 \quad 240 \div \square = 6$$

Explain his mistake.



R

8a. Here are some digit cards.

| | | | |
|---|---|---|-----|
| 2 | ? | ? | 80 |
| ? | 8 | ? | 800 |

1 card is half the greatest 1-digit number.

2 cards are the 1-digit numbers multiplied by 10.

1 card is one of the 1-digit numbers multiplied by 100.

Create five different multiplication or division calculations.



PS

8b. Here are some digit cards.

| | | | |
|---|---|----|-----|
| 3 | ? | 2 | 600 |
| ? | ? | 30 | ? |

1 card is the two 1-digit numbers multiplied together.

2 cards are the 1-digit numbers multiplied by 10.

1 card is one of the 1-digit numbers multiplied by 100.

Create five different multiplication or division calculations.



PS

9a. Edith says,



$8 \times 4 = 32$, so
 $320 \div 40 = 80$.

Do you agree? Explain why.



R

9b. John says,



$5 \times 2 = 10$, so
 $50 \times 20 = 100$.

Do you agree? Explain why.



R

Reasoning and Problem Solving Related Calculations

Developing

1a. $80 \div 20 = 40$. The correct answer is $80 \div 20 = 4$. Mary has divided by 2, not 20.

2a. Various answers, for example:

$$4 \times 5 = 20, 5 \times 4 = 20, 20 \div 5 = 4,$$

$$40 \times 5 = 200, 4 \times 50 = 200$$

3a. Eva is correct. Each heart is worth 10, so the array shows 40×2 or 20×4 which equals 80. This is a related fact to 4×2 .

Expected

4a. $180 \div 6 = 3$. The correct answer is $180 \div 60 = 3$. Lily has divided by 6 and not 60.

5a. Various answers, for example:

$$3 \times 5 = 15, 15 \div 5 = 3, 5 \times 3 = 15,$$

$$50 \times 3 = 150, 150 \div 3 = 50.$$

6a. Sharon is correct. Each gem is worth 10, her array shows 60×4 or 40×6 which equals 240. This is a related fact to 4×6 .

Greater Depth

7a.

$$\begin{array}{l} 6 \times \boxed{8} = 48 \quad 80 \times 6 = \boxed{480} \\ \boxed{480} \div 8 = 60 \quad 700 \div \boxed{80} = 6 \end{array}$$

In the last number sentence, Elena has not used a number in the fact family. 700 should be changed to 480.

8a. Various answers, for example: missing numbers = 4, 20, 40, 400/200; $2 \times 4 = 8$; $20 \times 4 = 80$; $2 \times 40 = 80$; $20 \times 40 = 800$; $800 \div 40 = 20$

9a. Edith is incorrect. If $8 \times 4 = 32$, $320 \div 40 = 8$ not 80. 320 is 10 times greater than 32, so only one other number in the division should be multiplied by 10.

Reasoning and Problem Solving Related Calculations

Developing

1b. $50 \div 4 = 200$. The correct answer is $200 \div 50 = 4$. Drew has not ordered his calculation correctly.

2b. Various answers, for example:

$$4 \times 4 = 16, 160 \div 40 = 4, 40 \times 4 = 160$$

$$160 \div 4 = 40$$

3b. Leon is incorrect. Each shell is worth 1, so the array shows 5×2 or 2×5 which equals 10, which is the same fact.

Expected

4b. $180 \div 80 = 4$. The correct answer is $320 \div 80 = 4$. Daniel has not used the correct related number in his division.

5b. Various answers, for example:

$$8 \times 3 = 24, 24 \div 8 = 3, 3 \times 8 = 24,$$

$$80 \times 3 = 240, 240 \div 8 = 30.$$

6b. Colin is correct. His array is made up of 8 rows of 4, with each gem valued at 10. $8 \times 40 = 320$ or 80×4 are related facts to $320 \div 8$.

Greater Depth

7b.

$$\begin{array}{l} 6 \times \boxed{4} = 24 \quad 60 \times 4 = \boxed{240} \\ \boxed{600} \div 6 = 100 \quad 240 \div \boxed{40} = 6 \end{array}$$

In the first division sentence, Aaron has a correct division, however it is not part of the fact family. It could have been $240 \div 6 = 40$.

8b. Various answers, for example: missing digits = 6, 60, 20, 300/200; $3 \times 2 = 6$; $20 \times 3 = 60$; $2 \times 30 = 60$; $20 \times 30 = 600$; $600 \div 30 = 20$

9b. John is incorrect. 5 and 2 have both been multiplied by 10, so the answer should be multiplied by 100. It should be 1,000 not 100.