

Reasoning and Problem Solving

Step 4: Efficient Multiplication

National Curriculum Objectives:

Mathematics Year 4: (4C6a) [Recall multiplication and division facts for multiplication tables up to \$12 \times 12\$](#)

Mathematics Year 4: (4C6b) [Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers](#)

Mathematics Year 4: (4C6c) [Recognise and use factor pairs and commutativity in mental calculations](#)

Mathematics Year 4: (4C8) [Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as \$n\$ objects are connected to \$m\$ objects](#)

Differentiation:

Questions 1, 4 and 7 (Reasoning)

Developing Investigate two methods of multiplication and explain which method is most efficient. Involving 2-digit numbers up to 20 multiplied by 2, 3, 4 and 5.

Expected Investigate two methods of multiplication and explain which method is most efficient. Involving 2-digit numbers, more than 20 multiplied by 6, 7, 8 and 9.

Greater Depth Investigate two methods of multiplication and explain which method is most efficient. Involving multiplying 2-digit numbers and known multiplication facts; written in words.

Questions 2, 5 and 8 (Problem Solving)

Developing Complete the calculation using the digit cards to find the missing numbers to equal a fixed total. Include numbers that can be multiplied by 2, 3, 4 or 5.

Expected Complete the calculation using the digit cards to find the missing numbers to equal a fixed total. Include numbers that can be multiplied by 6, 7, 8 or 9.

Greater Depth Complete the calculation using the digit cards. Find two different methods to solve the calculation and explain if one is more efficient.

Questions 3, 6 and 9 (Reasoning)

Developing Compare the accuracy of a statement using $<$, $>$, $=$. Includes multiplying 2-digits by 1-digit and factors of 2, 3, 4 and 5.

Expected Compare the accuracy of a statement using $<$, $>$, $=$. Includes multiplying 2-digits by 1-digit and factors of 6, 7, 8 and 9.

Greater Depth Compare the accuracy of a statement using $<$, $>$, $=$. Includes multiplying 2-digits and known multiplication facts; written in words.

More [Year 4 Multiplication and Division](#) resources.

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

Efficient Multiplication

1a. Two methods have been used to calculate 18×4 .

Method A

Multiply 20×4 and subtract 2×4 .

Method B

Multiply 10×4 and 8×4 . Add the amounts together.

Which method is the most efficient? Explain your reasoning.



R

Efficient Multiplication

1b. Two methods have been used to calculate 17×3 .

Method A

Multiply 5×3 twice and 7×3 . Add the amounts together.

Method B

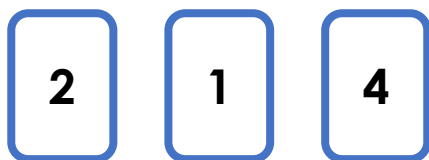
Multiply 20×3 and subtract 3×3 .

Which method is the most efficient? Explain your reasoning.



R

2a. Use two of the digit cards to complete the calculation below.



$$\boxed{} \boxed{9} \times \boxed{} = \boxed{76}$$



PS

2b. Use two of the digit cards to complete the calculation below.



$$\boxed{1} \boxed{} \times \boxed{} = \boxed{70}$$



PS

3a. Isha writes the following statement.

$$18 \times 5 < 7 \times 2 \times 5$$



18×5 is less than $7 \times 2 \times 5$ because 18 is less than 7×2 .

Do you agree with Isha? Prove it.



R

3b. Harry writes the following statement.

$$20 \times 4 > 4 \times 5 \times 4$$



20×4 is greater than $4 \times 5 \times 4$ because 20 is a larger number than 4.

Do you agree with Harry? Prove it.



R

Efficient Multiplication

4a. Two methods have been used to calculate 38×6 .

Method A

Multiply 40×6 ,
subtract 2×6 .

Method B

Multiply 10×6
three times.
Add 8×6 .

Which method is the most efficient?
Explain your reasoning.



R

Efficient Multiplication

4b. Two methods have been used to calculate 42×9 .

Method A

Multiply 40×9
and add 2×9 .

Method B

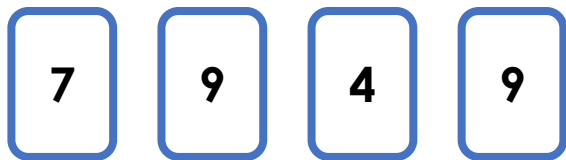
Multiply 20×9
twice and add
 2×9 .

Which method is the most efficient?
Explain your reasoning.



R

5a. Use three of the digit cards to complete the calculation below.

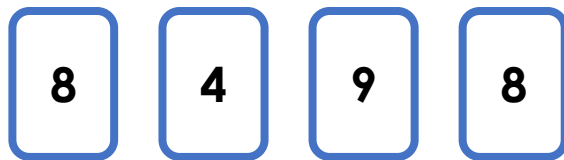


$$\boxed{} \boxed{} \times \boxed{} = \boxed{343}$$



PS

5b. Use three of the digit cards to complete the calculation below.



$$\boxed{} \boxed{} \times \boxed{} = \boxed{384}$$



PS

6a. Jack writes the following statement.

$$42 \times 9 > 7 \times 9 \times 9$$



42×9 is greater
than $7 \times 9 \times 9$
because 42 is a
larger number than
seven.

Do you agree with Jack? Prove it.



R

6b. Grace writes the following statement.

$$54 \times 6 > 9 \times 6 \times 6$$



54×6 is greater
than $8 \times 6 \times 6$
because $8 + 6$ is 14
and 54 is a larger
number than 14.

Do you agree with Grace? Prove it.



R

Efficient Multiplication

Efficient Multiplication

7a. Two methods have been used to calculate 68×9 .

Method A
Multiply seventy by nine and subtract eighteen.

Method B
Multiply thirty by nine, twice. Add seventy two.

Which method is the most efficient?
Explain your reasoning.



R

7b. Two methods have been used to calculate 71×7 .

Method A
Multiply ten by seven, seven times and add seven.

Method B
Multiply seventy by seven and add seven.

Which method is the most efficient?
Explain your reasoning.



R

8a. Rosie is trying to complete 84×6 . She uses a combination of the following numbers.

10	4	20	40
80	2	50	6

Find two different ways Rosie could have solved the equation. Is one method easier to use than the other?



PS

8b. Taha is trying to complete 93×6 . She uses a combination of the following numbers.

30	10	9	6
80	5	3	90

Find two different ways Taha could have solved the equation. Is one method easier to use than the other?



PS

9a. Imran writes the following statement.

$$56 \times 11 = 50 \times 11 + 6 \times 11$$



This is the most efficient method to calculate the answer.

Do you agree with Imran? Prove it.



R

9b. Layla writes the following statement.

$$54 \times 12 = 54 \times 10 + 54 \times 2$$



This is the most efficient method to calculate the answer.

Do you agree with Layla? Prove it.



R

Reasoning and Problem Solving Efficient Multiplication

Developing

1a. Method A and B are equally efficient because they both use multiplying multiples of 10 to help find the answer.

2a. $19 \times 4 = 76$

3a. Isha is incorrect because:

$18 \times 5 = 90$; $7 \times 2 \times 5 = 14 \times 5 = 70$;

$18 \times 5 > 7 \times 2 \times 5$.

Expected

4a. Various possible answers, for example: Method A is the most efficient because it is quicker to multiply 40×6 and subtract 12 as it uses fewer steps in the calculation.

5a. $49 \times 7 = 343$

6a. Jack is incorrect because:

$42 \times 9 = 378$; $7 \times 9 \times 9 = 63 \times 9 = 567$;

$42 \times 9 < 7 \times 9 \times 9$.

Greater Depth

7a. Method A is the most efficient because it is quicker to multiply to the nearest multiple of 10 and subtract 18.

8a. Various possible answers, for example: $80 \times 6 + 4 \times 6$ or $40 \times 6 \times 2 + 4 \times 6$.

Explanations for which method is easier could make reference to there being fewer steps in the calculation; easier for mental calculation etc.

9a. Imran is incorrect because the most efficient way to multiply 56×11 is to multiply 56×10 and 56×1 .

Reasoning and Problem Solving Efficient Multiplication

Developing

1b. Method B is the most efficient because it uses fewer steps and multiplies a multiple of 10 rather than 5 to find the answer.

2b. $14 \times 5 = 70$

3b. Harry is incorrect because:

$20 \times 4 = 80$; $4 \times 5 \times 4 = 20 \times 4 = 80$;

$20 \times 4 = 4 \times 5 \times 4$.

Expected

4b. Various possible answers, for example: Method A is the most efficient because it is quicker to multiply to the closest multiple of 10 and add 18 as it uses fewer steps in the calculation.

5b. $48 \times 8 = 384$

6b. Grace is incorrect because:

$54 \times 6 = 324$; $9 \times 6 \times 6 = 54 \times 6 = 324$;

$54 \times 6 = 9 \times 6 \times 6$.

Greater Depth

7b. Method B is the most efficient because it is quicker to multiply the multiple of 10 and add 7.

8b. Various possible answers, for example: $30 \times 6 \times 3 + 3 \times 6$ or $90 \times 6 + 3 \times 6$.

Explanations for which method is easier could make reference to there being fewer steps in the calculation; easier for mental calculation etc.

9b. Layla is correct because multiplying by 10 and 2 is more efficient than trying to multiply by 12. It is also a method that can be done mentally.