



Year 6 multiplication and division

Prior Knowledge

- Recall multiplication and division facts for multiplication tables up to 12×12 (Y2-4)
- Show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot (Y2)
- Recognise and use factor pairs and commutativity in mental calculations (Y4)
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers (Y5)
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers (Y5)
- Establish whether a number up to 100 is prime and recall prime numbers up to 19 (Y5)
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers (Y5)
- Multiply and divide numbers mentally drawing upon known facts (Y5)
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context (Y5)
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000 (Y5)
- Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) (Y5)
- Solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes (Y5)
- Solve problems involving multiplication and division and a combination of these, including understanding the meaning of the equals sign (Y5)
- Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates (Y5)

multiplication and division		Working Towards	Within	Expected	Above
× ÷	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication				
	Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context				
	Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context				
	Perform mental calculations, including with mixed operations and large numbers				
	Identify common factors, common multiples and prime numbers				
	Use knowledge of the order of operations to carry out calculations involving the 4 operations				
	Solve problems involving multiplication and division				
	Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy				
Highlights: _____					

B	Brackets	$10 \times (4 + 2) = 10 \times 6 = 60$
O	Order	$5 + 2^2 = 5 + 4 = 9$
D	Division	$10 + 6 \div 2 = 10 + 3 = 13$
M	Multiplication	$10 - 4 \times 2 = 10 - 8 = 2$
A	Addition	$10 \times 4 + 7 = 40 + 7 = 47$
S	Subtraction	$10 \div 2 - 3 = 5 - 3 = 2$



Glossary

vocabulary	word class	definition
multiplication	noun	the process of combining matrices, vectors, or other quantities to obtain their product
division	noun	the process of dividing a matrix, vector, or other quantity to obtain a quotient
calculating	verb	determine (the amount or number of something) mathematically
arrays	noun	an arrangement of quantities or symbols in rows and columns; a matrix
integer	noun	a number which is not a fraction; a whole number
factor pairs		a set of two integers that give a particular product when multiplied together
product		the answer when two or more values are multiplied together
distributive law		multiplying a number by a group of numbers added together is the same as doing each multiplication separately
common factor	noun	when the factors of two or more numbers are found, the factors that are the same are the common factors
prime number	noun	a number that is divisible only by itself and 1 (e.g. 2, 3, 5, 7, 11)
prime factor		the prime factors of a positive integer are the prime numbers that divide that integer exactly
composite number	noun	a whole number that can be made by multiplying other whole numbers. Example: 6 can be made by 2×3 .
remainder	noun	the number which is left over in a division in which one quantity does not exactly divide another. Example: 23 divided by 3 is 7, remainder 2"
decimal	adjective	relating to or denoting a system of numbers and arithmetic based on the number ten, tenth parts, and powers of ten.
square number	noun	the product of a number multiplied by itself, e.g. 1, 4, 9, 16
cube number	noun	<i>the result when a number has been multiplied by itself twice.</i> The symbol for cubed is 3 . Example: 8 is a cube number because it's $2 \times 2 \times 2$
common multiples		<i>a common multiple is defined as a whole number, a shared multiple of each set of numbers</i>



Resources

x	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100



Future Learning

Key Stage 3

- Select and use appropriate calculation strategies to solve increasingly complex problems
- Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning
- Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property
- Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative
- Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals
- Recognise and use relationships between operations including inverse operations
- Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations
- Interpret and compare numbers in standard form $A \times 10^n$, $1 \leq A < 10$, where n is a positive or negative integer or zero

Key Stage 4

- Consolidate their numerical and mathematical capability from key stage 3 and extend their understanding of the number system to include powers, roots {and fractional indices}
- Select and use appropriate calculation strategies to solve increasingly complex problems, including exact calculations involving multiples of π {and surds}, use of standard form and application and interpretation of limits of accuracy
- Estimate powers and roots of any given positive number}
- Calculate with roots, and with integer {and fractional} indices
- Calculate exactly with fractions, {surds} and multiples of π ; {simplify surd expressions involving squares [for example $12 \ 4 \ 3 \ 4 \ 3 \ 2 \ 3 = x = x = x$ }
- Calculate with numbers in standard form $A \ 10^n$, where $1 \leq A < 10$ and n is an integer