**Transition: Advanced Multiplicative to Advanced Proportional Domain: Multiplication and Division**

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| **Achievement Objectives** | **Number: Levels Four and Five** |
| **Level Four**Number strategies and Knowledge A01:Use a range of multiplicative strategies when operating on whole numbers.**Level Five**Number strategies and Knowledge A02:Use prime numbers, common factors and multiples, and powers [including square roots].Number strategies and Knowledge A06:Know and apply standard form, significant figures, rounding, and decimal place value.  |

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| **Strategies being developed** | **Problem progression** | **References** | **Knowledge being developed** | **Resources** |
| Use exponents to solve multiplication problems, including those with areas and volumes | 8 × 16 = 🞏 from 23 × 24 = 2727 × 243 = 🞏 from 33 × 35 = 38642 = 🞏 from 43 × 43 = 46 = 🞏 from 82 = 64 = 🞏 from 302 = 900 = 🞏 from 53 = 125 | ***Teaching Multiplication and Division (Book 6)***[Powerful Numbers](https://nzmaths.co.nz/node/1027) (73-75)***Teaching Number Sense and Algebraic Thinking***[Squaring](https://nzmaths.co.nz/node/995) (28)[Square Roots](https://nzmaths.co.nz/node/994) (29)[Cubes and Cube Roots](https://nzmaths.co.nz/node/998) (30)***Figure It Out***N3-4.1 [Using Exponents](https://nzmaths.co.nz/node/3269) (22)N7/8 4.4 [Family Trees](https://nzmaths.co.nz/node/3478) (13) N7/8 4.4 [Building Squares](https://nzmaths.co.nz/node/3479) (14)N7/8 4.6 [Powerful Thought](https://nzmaths.co.nz/node/3556) (4)N7/8 4.6 [Factor Towers](https://nzmaths.co.nz/node/3560) (7)N7/8 4.6 [Tiling Teasers](https://nzmaths.co.nz/node/3561) (8)N7/8 4.6 [Alien Counting](https://nzmaths.co.nz/node/3568) (12)N7/8 4.6 [Alien Bacteria](https://nzmaths.co.nz/node/3580) (20) | Know simple powers of numbers to 10, e.g. 24 = 16, 53 = 125 | ***Figure It Out*** N7/8 4.4 [Calculator Power](https://nzmaths.co.nz/node/3482) (16)N7/8 4.4 [Cubic Capacity](https://nzmaths.co.nz/node/3483) (17)N7/8 4.4 [Growing Pains](https://nzmaths.co.nz/node/3523) (18)N7/8 4.4 [Fold and Crease](https://nzmaths.co.nz/node/3524) (19)N7/8 4.4 [Pip’s Pay](https://nzmaths.co.nz/node/3525) (20)NS&AT3.1 [The Power of Powers](https://nzmaths.co.nz/node/4111) (14-15) |

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| **Strategies being developed** | **Problem progression** | **References** | **Knowledge being developed** | **Resources** |
| Solve missing factor problems by reversing, e.g. 263 ? = 456 by456  263 = ? | 6 🞏 = 222 by222  6 = 37🞏 9 = 657 by657  9 = 732.4 🞏 = 20.64 by20.64 2.4 = 8.6🞏 0.63 = 23.184 by23.184  0.63 = 36.8 | ***Teaching Number Sense and Algebraic Thinking (Book 8)***[Reversals for Multiplication and Division](https://nzmaths.co.nz/node/993) (10) | Know what happens when a whole number or decimal is multiplied or divided by a power of ten,e.g. 4.57 × 100 = 457, 6.3 ÷ 0.9 = 7 |  |
| Know the divisibility rules for 2,3,4,5,6,8,9 and 10,e.g. 568 is divisible by 4 since 68 is divisible by 4 |
| Use estimation to check the answers to multiplication and division problems. | 48 32  50 30 = 1500196 14  200 14 = 28002718  9  2700  10 = 273283  49  3300  50 = 49667.7 4.3  8 4 = 3257.6  8.2  56 8 = 7591.61  88.3  600  90  7 | ***Teaching Number Sense and Algebraic Thinking (Book 8)***[Checking Multiplication by Estimation](https://nzmaths.co.nz/node/973) (11)[Checking Division by Estimation](https://nzmaths.co.nz/node/958) (11)***Figure It Out***N 3-4 [Hard Times](https://nzmaths.co.nz/node/3262) (15)N 3-4 [Multiplication Roundabouts](https://nzmaths.co.nz/node/3263) (16)BF 3-4 [Trying Times](https://nzmaths.co.nz/node/2904) (2)BF 3-4 [Eleventh Heaven](https://nzmaths.co.nz/node/2905) (3)BF 3-4 [Napier’s Bones](https://nzmaths.co.nz/node/2910) (8-9)N 7/8 L 2 [Planting with the Whānau](https://nzmaths.co.nz/node/3374) (6-7)N 7/8 L 2 [Fun Times](https://nzmaths.co.nz/node/3379) (13)N 7/8 L 2 [Divisive Tactics](https://nzmaths.co.nz/node/3409) (14)NS 7/8 1 L [It pays to win](https://nzmaths.co.nz/node/4198) (18)NS 7/8 1 L [Grocery Grapplers](https://nzmaths.co.nz/node/4200) (20)NS 7/8 1 L [Division Dilemmas](https://nzmaths.co.nz/node/4206) (24)NS&AT3.2 [Pizza Split](https://nzmaths.co.nz/node/4122) (6-7)N3 [Standing Room Only](https://nzmaths.co.nz/node/3148) (4)N 3-4 [Division Delights](https://nzmaths.co.nz/node/3265) (18)N 3-4 [Digital Dilemmas](https://nzmaths.co.nz/node/3266) (19) | Perform short multiplication and division with whole numbers and decimals, using standard algorithms, and explain how they work.Perform multiplication of multi-digit whole numbers and decimals, using a standard algorithm, and explain how it works |  |
| Identify highest common factors and least common multiples,e.g. Highest common factor of 48 and 64 is 8 |