

# Ultimate Math Invaders Curriculum & Content Details

<i>About Ultimate Math Invaders</i> .....	2
<i>Program Summary</i> .....	2
<i>Objectives and Expected Student Outcomes</i> .....	3
<i>Teacher Activities/Functions Enabled By UMI</i> .....	3
<i>Student Activities/Functions Enabled By UMI</i> .....	4
<i>Support Material Provided</i> .....	4
<i>Research</i> .....	4
<i>Curriculum References</i> .....	6
National Council of Teachers of Mathematics Principles & Standards.....	6
Match to California Content Standards & Frameworks for Mathematics K-7 .....	8
<b>CONTENT DESCRIPTORS</b> .....	<b>10</b>
Counting / Numeration .....	10
Addition .....	16
Subtraction .....	19
Extension Multiplication .....	22
Extension Division.....	28
Decimal +/- .....	33
Decimal x/+ .....	36
Fractions .....	38
Percentages.....	40
Squares and Square Roots.....	41
Powers .....	42
Directed Numbers (Operations with Integers) .....	46
<b>REVISION MATRICES</b> .....	<b>47</b>

Addition .....	47
Subtraction .....	48
Squares and Square roots .....	48
Powers .....	48
Decimal +/- .....	49
Decimal x/+ .....	49
Tables .....	50
Directed Numbers .....	50
Multiplication Extension .....	51
Division Extension.....	51
Counting.....	52
Fractions .....	52
Percentages.....	53

## About Ultimate Math Invaders

### Program Summary

- Ultimate Math Invaders™ is a math educational learning resource targeting **ages 5-15**.
- The program uses an arcade game format to present math questions from the Number strand, focusing on developing facility in number bonds and operations. Content covers **addition and subtraction, times tables, multiplication and division extension, fractions, decimals and percentages, squares and square roots, powers, and directed numbers (operations with integers)**.
- Questions are automatically generated within the program from a comprehensive set of content descriptors.
- There is an inbuilt Revision Matrix within the program that ensures that each level of content includes questions from the content of previous levels.
- Players play individually. Questions appear on the screen as descending 'invaders' which the player must eliminate by firing the correct answer.
- **Game play is customisable.** There are **four different game styles**, ranging from Novice to Extreme. The variables relate to game speed, frequency of invaders, random increase of invader speed, and direction from which invaders appear.
- The game proceeds through different 'space-scapes' as the game level increases. The speed of the invaders also increases with each game level. Players will eventually be defeated by the increasing speed of the invaders.
- Content is **fully customisable**. Content for each player can be selected from any level of any strand covered by the program. The default setting gives players questions from all content areas.
- The **Challenge Level** content is fixed for each level of the game, as is the game style, thus allowing players to test themselves against set content, thereby establishing a benchmark either for themselves or for group situations.

- The **Admin** section of the program allows supervisors to set up groups, assign specific math content to specific users or groups of users, and monitor student progress. **User statistics** for all questions attempted are displayed in the Admin section.
- The last 10 questions wrongly answered are kept by the program and available for scrutiny within the User statistics section of the program.
- The program is **fully networkable** and is both **Windows and Mac compatible** (Win 95 upwards, Ma OS9.2 upwards).

## Objectives and Expected Student Outcomes

- UMI is designed to make memorising tables and automatic recall of number facts as appealing as possible.
- In addition, the format of UMI means that students participating even in short game sessions receive a very high level of exposure to fast number recall problems.
- The game format is designed to keep students challenged. Beating their own personal best score becomes an ever-motivating challenge.
- UMI is intended both to strengthen weaker math students and extend high achievers. The game play variables mean that even students with physical disabilities can use the program successfully.
- The Custom Times Table facility within the game is extremely flexible, allowing students or teachers to set learning parameters beyond the orthodox 0-10 times tables range, up to and including 25x25.
- The Content Descriptors on which the question generation is based are available for scrutiny within the Curriculum information in the program.
- The most commonly reported benefit of students using UMI is their increased willingness to engage in learning and revising number facts and times tables for extended periods of time both in the classroom and at home, and the resultant growth in their math understanding and achievement levels.

## Teacher Activities/Functions Enabled By UMI

- UMI can be successfully utilized in many different classroom contexts. For example:
  - (1) "Warm Up" product for the beginning of class. With the control the teacher has over selecting the questions, s/he could match the content to the content recently taught.
  - (2) End of class game during the last ten minutes of math class, perhaps along the lines of game show, awarding team points, etc.
  - (3) Extension tool for individual gifted and talent students, or groups of students.
  - (4) One-on-one remedial tool for less able students.
  - (5) Homework tool (if all students owned the program)

## Student Activities/Functions Enabled By UMI

- UMI enables students to have fun while they learn. The 'fun' component makes the program a very powerful learning tool. Children are very receptive to information imparted in the context of enjoyment.
- The depth, variety, and richness of the math content in the program provide a very high quality learning experience. The arcade-game format means that action is fast and furious – UMI makes math an addictive pastime.

## Support Material Provided

- UMI provides full details of the scope and sequence of math content embedded in the program.
- UMI also provides a correlation of the program content with the Principles and Standards of the National Council of Teachers of Mathematics (NCTM).

## Research

- The program has been developed from extensive surveys of best primary and lower secondary mathematics practise worldwide.
- A list of documents consulted and their original sources follows:

**NCTM Principles and Standards**

<http://standards.nctm.org/document/>

**UK National Numeracy Strategy – Framework for Teaching Mathematics**

[http://www.standards.dfes.gov.uk/numeracy/teaching\\_resources/](http://www.standards.dfes.gov.uk/numeracy/teaching_resources/)

**Irish Republic Primary School Mathematics Curriculum**

[http://82.195.132.36:5050/j/mat\\_prim.htm](http://82.195.132.36:5050/j/mat_prim.htm)

**and Junior Certificate Mathematics Syllabus**

<http://www.education.ie/home/home.jsp?maincat=&pcategory=17216&ecategory=17317&sectionpage=&subject=17705&language=EN&link=&page=>

**Scottish National Guidelines 5-14 Mathematics**

<http://www.ltscotland.org.uk/5to14/subjects/index.asp?bDisplayDetails=1&iSubjectID=1467377268>

**Mathematics in the New Zealand Curriculum**

<http://www.minedu.govt.nz/index.cfm?layout=document&documentid=3526&indexid=1005&indexparentid=1004>

**Commonwealth of Australia National Numeracy Benchmarks**

<http://online.curriculum.edu.au/numbench/index.htm>

**New South Wales Mathematics Syllabus K-6**

<http://www.bosnsw-k6.nsw.edu.au/>

**7-12**

<http://online.curriculum.edu.au/numbench/index.htm>

**Northern Territory Learning Area Statement Mathematics Transition to Year 10**

[http://www.deet.nt.gov.au/education/ntcf/docs/a\\_overview.pdf](http://www.deet.nt.gov.au/education/ntcf/docs/a_overview.pdf)

**Queensland Mathematics Syllabus Years 1-10**

<http://www.qsa.qld.edu.au/yrs1to10/kla/mathematics/syllabus.html>

**South Australia R-7 Mathematics Teaching Resources**

[http://www.sacsa.sa.edu.au/index\\_fsfc.asp?t=LA](http://www.sacsa.sa.edu.au/index_fsfc.asp?t=LA)

**Tasmania – Essential Learnings – Outcomes and Standards**

<http://www.education.tas.gov.au/ocll/publications/default.htm>

**Victorian Mathematics Curriculum and Standards Framework**

<http://csf.vcaa.vic.edu.au/home.htm>

**Western Australian Mathematics Curriculum**

<http://www.curriculum.wa.edu.au/pages/framework/framework08.htm>

**Primary Mathematics Syllabus & Lower Secondary Mathematics Syllabus, Ministry of Education, Singapore**

<http://www.moe.gov.sg/cpdd/syllabuses.htm>

**Ontario Curriculum: Mathematics, Grades 1-8, 1997, 2005** <http://www.edu.gov.on.ca/eng/document/curricul/curr97ma/curr97m.html>

## Curriculum References

### National Council of Teachers of Mathematics Principles & Standards

<b>Grades Pre- K – 2</b>	<b>Grades 3 - 5</b>	<b>Grades 6 – 8</b>
<b>UMI Levels 1- 3</b>	<b>UMI Levels 3-6</b>	<b>UMI Levels 7+</b>
<p><b>Understand numbers and number systems</b> Count with understanding and recognize “how many” in sets of objects; Develop understanding of the relative position and magnitude of whole numbers; Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing and decomposing numbers; Connect number words and numerals to the quantities they represent, using various representations; Understand and represent commonly used fractions such as <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math> and <math>\frac{1}{2}</math>;</p> <p><b>Understand meanings of operations and how they relate to one another</b> Understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations; Understand the effects of adding and subtracting whole numbers; Understand situations that entail multiplication and division, such as equal groups of objects and sharing equally. Develop and use strategies for whole-number computations, with a focus on addition and subtraction; Develop fluency with basic number combinations</p>	<p><b>Understand numbers and number systems</b> Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals; Recognize equivalent representations for the same number and generate them by composing and decomposing numbers; Develop understanding of fractions as divisions of whole numbers; Recognize and generate equivalent forms of commonly used fractions, decimals and percents;</p> <p><b>Understand meanings of operations and how they relate to one another</b> Understand various meanings of multiplication and division; Understand the effects of multiplying and dividing whole numbers; Identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems;</p> <p><b>Compute fluently and make reasonable estimates.</b> Develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems, such as <math>30 \times 50</math>; Develop fluency in adding, subtracting, multiplying and dividing whole numbers;</p>	<p><b>Understand numbers and number systems</b> Work flexibly with fractions, decimals and percents to solve problems; Develop meaning for percents greater than 100 and less than 1; Develop an understanding of large numbers and recognize and appropriately use exponential and scientific notation; Develop meanings for integers and represent and compare quantities with them.</p> <p><b>Understand meanings of operations and how they relate to one another</b> Understand the meaning and effects of arithmetic operations with fractions, decimals and integers; Use the associative and commutative properties of addition and multiplication and the distributive property of multiplication over addition to simplify computations with integers, fractions and decimals; Understand and use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems.</p> <p><b>Compute fluently and make reasonable estimates</b> Select appropriate methods and tools for computing with fractions and decimals; Develop and analyze algorithms for computing</p>

<p>for addition and subtraction.</p> <p style="text-align: center;"><b>Connections</b></p> <p>Recognize and use connections among mathematical ideas; Understand how mathematical ideas interconnect and build on one another to produce a coherent whole;</p>	<p style="text-align: center;"><b>Connections</b></p> <p>Recognize and use connections among mathematical ideas; Understand how mathematical ideas interconnect and build on one another to produce a coherent whole;</p>	<p>with fractions, decimals and integers and develop fluency with their use; Develop and use strategies to estimate the results of rational-number computations and judge the reasonableness of the results;</p> <p style="text-align: center;"><b>Connections</b></p> <p>Recognize and use connections among mathematical ideas; Understand how mathematical ideas interconnect and build upon one another to produce a coherent whole;</p>
--	---	--

***Principles and Standards*** reflects the most current thinking, research, experience, and expertise of a wide variety of groups with an interest in mathematics education. According to Joan Ferrini-Mundy, chair of the 26-member NCTM writing group, ***Principles and Standards*** provides guidelines for excellence in mathematics education and issues a call for all students to engage in more challenging mathematics. It features ten standards addressing the mathematical content and process that students should know in each of the pre-kindergarten through grade twelve years. For further details visit the website at: [www.nctm.org/standards](http://www.nctm.org/standards)

**Ultimate Math Invaders™**  
**Match to California Content Standards & Frameworks for Mathematics K-7**

Standards-based instructional content as stated in the California Mathematics Framework listed by Strand and standards	Corresponding UMI Level
<b>Kindergarten</b>	
<i>Number Sense</i>	
1.0 Students understand the relationship between numbers and quantities (i.e., that a set of objects has the same number of objects in different situations regardless of its position or arrangement):	<b>Levels 1-2</b>
1.2 Count, recognize, represent, name, and order a number of objects (up to 30).	
<b>Grade One</b>	
<i>Number Sense</i>	
2.0 Students demonstrate the meaning of addition and subtraction and use these operations to solve problems:	<b>Levels 2-3</b>
2.1 Know the addition facts (sums to 20) and the corresponding subtraction facts and commit them to memory.	
2.2 Use the inverse relationship between addition and subtraction to solve problems.	
2.3 Identify one more than, one less than, 10 more than, 10 less than a given number.	
2.6 Solve addition and subtraction problems with one- and two-digit numbers (e.g., $5 + 58 = \underline{\quad}$ ).	<b>Levels 3-4</b>
2.7 Find the sum of three one-digit numbers.	
<b>Grade Two</b>	
<i>Number Sense</i>	
1.0 Students understand the relationship between numbers, quantities, and place value in whole numbers up to 1,000:	<b>Levels 3-4</b>
1.1 Count, read, and write whole numbers to 1,000 and identify the place value for each digit.	
2.0 Students estimate, calculate, and solve problems involving	<b>Levels</b>



addition and subtraction of two- and three-digit numbers.	<b>4-5</b>
2.3 Use mental arithmetic to find the sum or difference of two two-digit numbers.	
3.0 Students model and solve simple problems involving multiplication and division:	<b>Levels 3-4</b>
3.3 Know the multiplication tables of 2s, 5s and 10s (to “times 10”) and commit them to memory.	
<b>Grade Three</b>	
<i>Number Sense</i>	
1.0 Students understand the place value of whole numbers:	<b>Level 2→</b>
1.3 Identify the place value for each digit in numbers to 10,000.	<b>Levels 5-6</b>
2.0 Students calculate and solve problems involving addition, subtraction, multiplication, and division:	
2.2 Memorize to automaticity the multiplication table for numbers between 1 and 10.	
2.6 Understand the special properties of 0 and 1 in multiplication and division.	
<b>Grade Four</b>	
<i>Number Sense</i>	
3.0 Students solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationships among the operations:	<b>Levels 5-6</b>
3.1 Demonstrate an understanding of, and the ability to use, standard algorithms for the addition and subtraction of multidigit numbers.	
3.4 Solve problems involving division of multidigit numbers by one-digit numbers.	
<b>Grade Five</b>	
<i>Number Sense</i>	
2.0 Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals:	<b>Levels 6-11</b>
2.1 Add, subtract, multiply, and divide with decimals; add with negative integers; subtract positive integers from negative integers; and verify the reasonableness of the results.	<b>Level 7+</b>

2.2 Demonstrate proficiency with division, including division with positive decimals and long division with multidigit divisors.	
2.4 Understand the concept of multiplication and division of fractions.	
2.5 Compute and perform simple multiplication and division of fractions and apply these procedures to solving problems.	
<b>Grade Six</b>	
<i>Number Sense</i>	
2.0 Students calculate and solve problems involving addition, subtraction, multiplication and division:	<b>Level 5+</b>
2.2 Explain the meaning of multiplication and division of positive fractions and perform the calculations (e.g., $5/8 \div 15/16 = 5/8 \times 16/15 = 2/3$ ).	
2.3 Solve addition, subtraction, multiplication, and division problems that use positive and negative integers and combinations of these operations.	<b>Level 7+</b>
<b>Standards-based instructional content as stated in the California Mathematics Framework listed by Strand and standards</b>	<b>(UMI Level)</b>

## CONTENT DESCRIPTORS

### Counting / Numeration

<b>1a</b>	50	Count groups of objects to 5
<b>1a</b>	25	(Numbers 1 – 4) + 1
<b>1a</b>	25	(Numbers 2-5) - 1
	<b>100</b>	
<b>1b</b>	50	Count groups of objects to 10
<b>1b</b>	25	(Numbers 0 – 9) + 1
<b>1b</b>	25	(Numbers 1 - 10) - 1
	<b>100</b>	
<b>2</b>	10	(Numbers 0 – 9) + 1

**2** 10 (Numbers 1 - 10) - 1  
**2** 25 (Numbers 10 - 19) + 1  
**2** 25 (Numbers 11 - 20) - 1  
**2** 15 (Numbers 0 - 8) + 2  
**2** 15 (Numbers 2 - 10) - 2  
**100**

**3a** 7 (Numbers 0 - 19) + 1  
**3a** 8 (Numbers 1 - 20) - 1  
**3a** 10 (Numbers 20 - 29) + 1  
**3a** 10 (Numbers 21 - 30) - 1  
**3a** 7 (Even numbers 0 - 28) + 2  
**3a** 8 (Even numbers 2 - 30) - 2  
**3a** 7 (Odd numbers 1-7) + 2  
**3a** 8 (Odd numbers 3-9) - 2  
**3a** 7 (Numbers 0,5,10,15,20,25) + 5  
**3a** 8 (Numbers 5,10,15,20) - 5  
**3a** 10 (Numbers 1 - 9) + 10  
**3a** 10 (Numbers 11 - 19) - 10  
**100**

**3b** 7 (Numbers 0 - 49) + 1  
**3b** 8 (Numbers 1 - 50) - 1  
**3b** 7 (Numbers 1 - 19) + 10  
**3b** 8 (Numbers 11 - 29) - 10  
**3b** 7 (Even numbers 0 - 48) + 2  
**3b** 8 (Even numbers 2 - 50) - 2  
**3b** 7 (Odd numbers 1-17) + 2  
**3b** 8 (Odd numbers 3-19) - 2  
**3b** 7 (Numbers 0,5,10,15,20,25,30,35,40,45) + 5  
**3b** 8 (Numbers 5,10,15,20,25,30,35,40,45,50) - 5  
**3b** 7 (10 multiples 0 - 40) + 10  
**3b** 8 (10 multiples 10 - 50) - 10  
**3b** 10 x tens (from 1 ten to 4 tens), y ones (from 1 one to 9 ones) written vertically  
**100**

3c	8	(Numbers 0 – 99) + 1
3c	7	(Numbers 1 - 100) - 1
3c	8	(Numbers 1 – 40) + 10
3c	7	(Numbers 11 – 49) - 10
3c	5	(Even numbers 0 – 48) + 2
3c	5	(Even numbers 2 – 50) - 2
3c	8	(Odd numbers 1-47) + 2
3c	7	(Odd numbers 3-49) - 2
3c	8	(5 multiples 0-95) + 5
3c	5	(5 multiples 5-100) - 5
3c	7	(10 multiples 0 – 90) + 10
3c	8	(10 multiples 10 – 100) - 10
3c	7	x tens (from 1 ten to 9 tens), y ones (from 1 one to 9 ones) written vertically
3c	10	2 digit number with one digit highlighted eg 47 with 7 highlighted. "Value of" on one line, number on 2nd line
	<b>100</b>	
4a	2	(Numbers 0 – 99) + 1
4a	3	(Numbers 1 - 100) - 1
4a	7	(100 Multiples 100 – 800) + 100
4a	8	(100 Multiples 100 – 800) - 100
4a	5	(Numbers 1 – 90) + 10
4a	5	(Numbers 11 – 99) - 10
4a	5	(Even numbers 0 – 98) + 2
4a	5	(Even numbers 2 – 100) - 2
4a	5	(Odd numbers 1 - 97) + 2
4a	5	(Odd numbers 3 -99) - 2
4a	7	(5 multiples 0 - 95) + 5
4a	8	(5 multiples 5 - 50) - 5
4a	7	(10 multiples 0 – 190) + 10
4a	8	(10 multiples 10 – 200) - 10
4a	7	x tens (from 1 ten to 9 tens), y ones (from 1 one to 9 ones) written vertically
4a	8	2 digit number with one digit highlighted eg 47 with 7 highlighted. "Value of" on one line, number on 2nd line
4a	3	(3 multiple 0-57) + 3
4a	2	(3 multiple 3-60) - 3
	<b>100</b>	
4b	5	(Numbers 0 – 998) + 1

**4b** 5 (Numbers 1 - 999) - 1  
**4b** 5 (Numbers 1 – 980) + 10  
**4b** 5 (Numbers 11 – 999) - 10  
**4b** 5 (10 multiples 0 – 980) + 10  
**4b** 5 (10 multiples 10 – 990) - 10  
**4b** 8 (Numbers 0 – 899) + 100  
**4b** 8 (Numbers 100 – 999) - 100  
**4b** 3 (Even numbers 0 – 98) + 2  
**4b** 3 (Even numbers 2 – 100) - 2  
**4b** 3 (Odd numbers 1 - 97) + 2  
**4b** 3 (Odd numbers 3 -99) - 2  
**4b** 3 (5 multiples 0 - 95) + 5  
**4b** 5 (5 multiples 5 - 100) - 5  
**4b** 5 (10 multiples 0 – 980) + 10  
**4b** 5 (10 multiples 10 – 990) - 10  
**4b** 8 2- or 3-digit number with one digit highlighted. "Value of" on one line, number on 2nd line  
**4b** 8 (3 multiple 0-57) + 3  
**4b** 8 (3 multiple 3-60) - 3  
**100**

**5a** 8 (Numbers 1000 – 9998) +/- 1  
**5a** 12 (Numbers 1000 – 9989) +/- 10  
**5a** 12 (Numbers 1100 – 9899) +/- 100  
**5a** 10 (Numbers 1000 – 8999) +/- 1000  
**5a** 12 (Numbers 1 - 999) x 10  
**5a** 8 (10 multiples 10 – 9990) ÷ 10  
**5a** 16 3- or 4-digit number with one digit highlighted. "Value of" on one line, number on 2nd line  
**5a** 12 (50 multiples 0 – 950) + 50  
**5a** 10 (50 multiples 50 – 1000) - 50  
**100**

**5b** 37 (50 multiples 0 – 9950) +/- 50  
**5b** 38 (500 multiples 500 – 5000) +/- 500  
**5b** 25 (Numbers 1 – 20) x 100  
**100**

<b>6</b>	6	(Numbers 10 000 – 99 998) +/- 1
<b>6</b>	10	(Numbers 10 000 – 99 989) +/- 10
<b>6</b>	10	(Numbers 10 100 – 99 899) +/- 100
<b>6</b>	9	(Numbers 10 000 – 98 999) +/- 1000
<b>6</b>	10	5-digit number with one digit highlighted. "Value of" on one line, number on 2nd line
<b>6</b>	10	(Numbers 1000 - 9999) x 10
<b>6</b>	9	(10 multiples 1000 – 99 990) ÷ 10
<b>6</b>	9	(Numbers 100 - 999) x 100
<b>6</b>	9	(100 multiples 100 – 99 000) ÷ 100
<b>6</b>	9	(100 multiples 100 – 1000) x 1000
<b>6</b>	9	(1000 multiples 10 000 – 100 000) ÷ 1000
	<b>100</b>	
<b>7a</b>	40	(2-digit number) ÷ 10
<b>7a</b>	40	(Numbers 1 – 19.9) +/- 0.1
<b>7a</b>	20	(Multiples of 0.5 from 0.5 – 10) +/- 0.5 eg 1.5 + 0.5
	<b>100</b>	
<b>7b</b>	20	(2- or 3-digit number) ÷ 10
<b>7b</b>	20	(2-digit number) x 0.1
<b>7b</b>	20	(Numbers with 2 digits and 1 decimal place eg 76.2) +/- 0.1
<b>7b</b>	20	Given a number with 2 digits plus 1 dec. place with one number highlighted. "Value of" on one line, number on 2nd line
<b>7b</b>	20	(Multiples of 0.5 from 10.5 – 20) +/- 0.5 eg 15 - 0.5 (Write integers as either 15 or 15.0)
	<b>100</b>	
<b>8</b>	25	(2- or 3-digit number) ÷ 100
<b>8</b>	25	(3-digit number) x 0.01
<b>8</b>	25	4-, 5- or 6-digit integer with one digit highlighted. "Value of" on one line, number on 2nd line
<b>8</b>	25	Given a number with tens, ones and 2 dec. places with one digit highlighted. "Value of" on one line, number on 2nd line
	<b>100</b>	
<b>9</b>	8	(Numbers with 1 or 2 digits and 1 or 2 decimal places eg 76.21) +/- 0.01
<b>9</b>	8	(2-, 3- or 4-digit number) ÷ 1000
<b>9</b>	8	(2-, 3- or 4-digit number) x 0.001
<b>9</b>	12	(2- or 3-digit number) ÷ 0.1

<b>9</b>	12	(2- or 3-digit number) $\div$ 0.01
<b>9</b>	8	(Negative integers 0 to $-100$ ) + 1
<b>9</b>	8	(Negative integers 0 to $-100$ ) - 1
<b>9</b>	11	(Negative integers 0 to $-100$ ) + 10
<b>9</b>	7	(Negative integers 0 to $-100$ ) - 10
<b>9</b>	11	(Negative integers 0 to $-100$ ) + 5
<b>9</b>	7	(Negative integers 0 to $-100$ ) - 5
	<b>100</b>	

## Addition

<b>1a</b>	100 <b>100</b>	Number pairs totaling 2 to 5, no zeros eg 1+1 up to 4+1 or 1+4
<b>1b</b>	100 <b>100</b>	Number pairs totaling 0 to 5 eg 0+0 to 3+2etc
<b>2a</b>	100 <b>100</b>	Number pairs totaling 0 to 8
<b>2b</b>	75	Number pairs totaling 0 to 10
<b>2b</b>	25 <b>100</b>	(Numbers 0-19) +1
<b>3a</b>	100 <b>100</b>	Number pairs totaling 0 to 15
<b>3b</b>	70	Single digit number pairs
<b>3b</b>	10	Addition of 3 single digit numbers, totals up to and including 20 eg 7+3+6
<b>3b</b>	20 <b>100</b>	(Numbers 0-99) +1
<b>4a</b>	30	Number pairs totaling up to and including 20
<b>4a</b>	14	Ten multiples totaling 0 – 100
<b>4a</b>	12	Doubles of any numbers up to 20
<b>4a</b>	12	Addition of 3 numbers, totals up to and including 30 eg 7+3+6
<b>4a</b>	12	Addition of 3 ten multiples, totals up to and including 100
<b>4a</b>	10	Pairs of ten multiples totaling 100. eg 30 +?=100
<b>4a</b>	10 <b>100</b>	Teens number + twenties number no regrouping eg 26+12
<b>4b</b>	9	Doubles of any numbers up to 50
<b>4b</b>	25	Number pairs totaling up to and including 50 eg 32+14,8+15
<b>4b</b>	9	Teens number + twenties number no regrouping eg 26+12
<b>4b</b>	9	(Teens number) + (twenties number) with regrouping eg 26+15



<b>4b</b>	13	Number pairs totaling 100 eg $42+?=100$
<b>4b</b>	9	(3-digit 100 multiples) + (1-digit)
<b>4b</b>	9	(Numbers 0-999) + 1
<b>4b</b>	9	Five multiples totaling 100 eg $45 + ? = 100$
<b>4b</b>	8	Addition of 3 numbers, totals up to and including 50 eg $19+21+5$
	<b>100</b>	
<b>5a</b>	7	Pairs of hundred multiples totaling 200 – 1000 eg $400+500$
<b>5a</b>	7	(Numbers 0-990) + 10
<b>5a</b>	7	(Numbers 0-900) + 100
<b>5a</b>	10	Number pairs totaling 50, eg $32 + ? = 50$
<b>5a</b>	10	(Ten multiple) + (2- or 3-digit), no 100s regrouping
<b>5a</b>	18	Number pairs totaling up to and including 100
<b>5a</b>	10	(Numbers 0-88) + 11
<b>5a</b>	10	(Numbers 0-91) + 9
<b>5a</b>	7	(Numbers 0 – 100) + (1-digit)
<b>5a</b>	7	(Teens number) + (twenties number) no regrouping eg $26+15$
<b>5a</b>	7	Addition of 3 numbers, totals up to and including 50 eg $19+31+25$
	<b>100</b>	
<b>5b</b>	9	(Numbers 0-81) + 19
<b>5b</b>	10	(3-digit) +9, no regrouping
<b>5b</b>	9	(Numbers 0-9900) + 100
<b>5b</b>	18	(2-digit) + (2-digit) , no regrouping
<b>5b</b>	18	(3-digit) + (2-digit), no regrouping
<b>5b</b>	8	Addition for any 3-digit number to make next highest 100 multiple eg $278+?=300$
<b>5b</b>	12	Addition of 3 numbers, totals up to and including 100 eg $19+31+25$
<b>5b</b>	8	(3-digit) +11, no regrouping
<b>5b</b>	8	(Numbers 0-79) + 21
	<b>100</b>	
<b>6</b>	15	(Numbers 0-99 000) + 1000
<b>6</b>	15	Fifty multiples totaling 1000 e.g. $350 + 650$
<b>6</b>	15	(2-digit 10 multiple) + (4-digit) no regrouping eg $4560 + 30$
<b>6</b>	27	(2-digit)+(2-digit)
<b>6</b>	13	(2-digit) + (2-digit), 10s and 100s regrouping eg $57+49$

<b>6</b>	15 <b>100</b>	(3-digit)+ (2-digit), no regrouping eg 364 + 28
<b>7</b>	10	(3-digit)+ (4-digit) no regrouping.
<b>7</b>	10	(1-digit) + (3- or 4-digit) across 1000s (e.g. 992 + 9)
<b>7</b>	10	(3-digit) + 21 (no 100s regrouping.)
<b>7</b>	10	(3-digit) + 31 (no 100s regrouping)
<b>7</b>	16	(1-digit) + (2- or 3-digit) with regrouping eg 195+7
<b>7</b>	13	(3-digit) + 111, 121, 131 not crossing a second 100s bound.
<b>7</b>	18	(Numbers 0 – 1000) + (2-digit)
<b>7</b>	13 <b>100</b>	(4-digit 100 multiple) + (4-digit 100 multiple)
<b>8</b>	10	(Numbers 0 – 1000) + (2-digit)
<b>8</b>	12	(3-digit) + 21 (with regrouping)
<b>8</b>	12	(3-digit) + 31 (with regrouping.)
<b>8</b>	12	Add 4-digit multiples of 500 eg 4500 +2500
<b>8</b>	12	Pairs of 500 multiples totaling 10 000 eg 6500 + ? = 10 000
<b>8</b>	15	(10 multiple) + (2- or 3-digit ten multiple) with regrouping eg 370+40
<b>8</b>	12	(3-digit) + 29 (no regrouping) eg 724+29
<b>8</b>	15 <b>100</b>	(Teens number) + (3- or 4-digit) with regrouping e.g. 992 + 19
<b>9</b>	50	(2-digit) + (3- or 4-digit) with regrouping e.g. 992 + 29
<b>9</b>	25	(3-digit) + 109, 119, 129 no regrouping of 100s eg 167 +129 not 177 + 129
<b>9</b>	25 <b>100</b>	(4-,5- or 6-digit) +(1000 multiple)
<b>10</b>	22	(3-digit) + 109, 119, 129 (no regrouping 100s)
<b>10</b>	22	(3-digit) + 121, 131 (regroup 100s)
<b>10</b>	56 <b>100</b>	(1-, 2-, 3- or 4-digit) + (1-, 2-, 3- or 4-digit)

## Subtraction

1	75	(Numbers 2-9) - (numbers 1-9) eg 7-2, no zero answers
1	25	(Numbers 2-20) - 1
	<b>100</b>	
2	20	(Numbers 1-9) - (numbers 0-9) eg 7-2, including zero answers
2	20	(Numbers 10 to 100) - 10 eg 76-10
2	20	(Numbers 9-50) - any single digit no.
2	20	Teens number - any 1-digit number (no decomposition) eg 17-5
2	20	(Numbers 1-100) minus 1
	<b>100</b>	
3	10	Teen number - 1-digit number (decomposition) eg 17-8
3	10	20s number - 1-digit number (no decomp) eg 27-5
3	12	Ten multiples (10-100) – a ten multiple eg 60-10
3	10	(Numbers 9 – 100) - (1-digit number) eg 78-6, 56-9
3	12	20s number - teens number across 20s bound eg 23-18
3	10	(Numbers 1-1000) – 1 eg 456-1, 650-1
3	11	(Numbers 10-1000) – 10 eg 453-10
3	10	(Numbers 100-1000) – 100 eg 675-100
3	15	20s number - 1-digit number crossing 20s bound eg 27-8
	<b>100</b>	
4	9	(2-digit) - teens number (no decomp) eg 46-15
4	8	(Ten multiples 10-990) – (1-digit number) eg 560-6
4	8	(Numbers 9-99) – 9 eg 41-9
4	9	(2-digit) – (2 digit) - difference is a single-digit number eg 45-36
4	8	(3-digit)- ten multiple (no decomp) eg 345-40
4	8	(Numbers 10-999) -10
4	8	(Numbers 100-999) -100
4	9	(3-digit) - (1- or 2-digit)- no decomposition eg 743-21
4	8	(2-digit) -ten multiple (no decomp) eg 56-30
4	9	(2-digit ) - (2-digit) no decomposition eg 67-34

4	8	(Numbers 20-99) – 20
4	8	(Numbers 21-99) – 21 eg 45-21
	<b>100</b>	
5	7	(2-digit) - teens number (no decomp) eg 46-15
5	7	(2-digit) - (1- or 2 digit) no decomposition
5	7	(Numbers 11-99) – 11 eg 34-11
5	6	(Numbers 19-99) – 19
5	7	(2-digit) - ten multiple eg 56-30
5	8	(2-digit) - (2-digit) no decomposition
5	6	(2-digit) - 29
5	6	(Numbers 100-10 000) – 100 eg 4623-100
5	7	(3-digit ten multiple) - ten multiple with decomp eg 560- 80
5	6	(Numbers 111-199) – 11 eg 156-11, 170-11
5	7	( 3-digit multiple of 100) - ( single-digit number) eg 500-7
5	7	(3-digit) - (2-digit) no decomp eg 569 – 27.
5	7	(3-digit) - (2-digit ten multiple) no decomp eg 345-40 but not 723 - 40
5	6	(3-digit) - 11 , no decomp eg 185-11 but not 209-11
5	6	(3-digit) -9 no decomp
	<b>100</b>	
6	7	(3-digit) - (2-digit) , no decomp
6	7	(2-digit) - (1- or 2- digit), with decomp eg 45-27, 56-8
6	7	(3-digit) - 29 - no 100s decomp eg 834 -29
6	8	Subtraction of single-digit numbers across a 100s bound eg 403-6
6	7	(4-digit) - (ten multiple) no 100s decomp eg 7689-70
6	7	(4-,5- or 6-digit) - (1000 multiple) no decomp eg 654398 -4000
6	7	(Numbers 1000-99 999) – 1000
6	8	(3-digit) - (1- or 2-digit)
6	7	(3-digit) – (3-digit ) with difference of a single-digit number eg 345-336
6	7	(3 digit) -11 no decomp eg 342-11
6	7	(3- or 4-digit) - (1-digit) across a 1000s bound. (e.g. 6004 – 8 )
6	7	(3-digit) - 19 , no100s decomp e.g. 343-19 but not 313-19
6	7	(4-digit) - (hundred multiple) no decomp eg 5632-400
6	7	(4-,5- or 6-digit) - (thousand multiple) no decomp eg 657398 -6000
	<b>100</b>	

7	12	(4-,5- or 6-digit) - (thousand multiple) no decomp eg 657398 -6000
7	15	(3-digit) - (1-,2- or 3-digit)
7	12	(4-digit) – (4-digit) with a difference of a single-digit number 5462 -5458
7	13	(4-digit 100 multiple) - (4-digit 100 multiple) eg 5600-2800
7	12	(100 multiples 100-10 000) – (1-digit) eg 2500-7
7	12	(1000 multiples 1000-99 000) – (1-digit) eg 4000-6
7	12	(4-digit) - (10 multiple) with decomp eg 7539-60
7	12	(4-digit) – (100 multiple) with 1000s decomp eg 5278-400
	<b>100</b>	
8	20	(4-digit) – (100 multiple) with 1000s decomp eg 5278-400
8	20	(4-,5- or 6-digit)- (1000 multiple) with decomp eg 655398 -6000
8	20	(3-digit) - 109, 119, 129 not crossing second 100s bound eg 467 - 129
8	20	(3-digit) - 111, 121, 131 not crossing second 100s bound eg 750 - 131
8	20	(3-digit) – (3-digit ) with a difference of a teens number (no 100s decomp) eg 564-547, not 401-387
	<b>100</b>	
9	25	(4-,5- or 6-digit) - (1000 multiple) with decomp eg 655398 -6000
9	25	(4-digit)– (4-digit) no decomp eg 4728-1317
9	25	(4 digit) - (1-,2-,3- or 4-digit), no decomp
9	25	(4-digit) – (4-digit) with a difference of a teens number (no 1000s decomp) eg 6503-6489, not 6007-5991
	<b>100</b>	
10	16	(4-digit) - (4-digit) no decomp. eg 4728-1317
10	16	(3-digit)- 109, 119, 129 crossing second 100s bound eg 319 - 131
10	16	(3-digit)- 111, 121, 131 crossing a second 100s bound.
10	16	(4-digit)– (4-digit) with decomp. eg 4328- 2954
10	16	(4-digit) – (4-digit) with a difference of a teens number, crossing 1000s bound eg 6007-5991
10	20	(4-digit) - (1-,2- or 3-digit)
	<b>100</b>	

## Extension Multiplication

<b>3</b>	50	Double (numbers 1 – 10)
<b>3</b>	15	2 lots of (numbers 1 – 10)
<b>3</b>	20	2 groups of (numbers 1-10)
<b>3</b>	5	3 groups of 2
<b>3</b>	5	4 groups of 2
<b>3</b>	5	5 groups of 2
	<b>100</b>	
<b>4</b>	25	Double (numbers 1 – 15)
<b>4</b>	10	Double (ten multiples 10 – 40)
<b>4</b>	10	Double (5 multiples from 5 – 30)
<b>4</b>	15	2 groups of (numbers 1-10)
<b>4</b>	10	3 groups of 2, 5, 10
<b>4</b>	10	4 groups of 2, 5, 10
<b>4</b>	10	5 groups of 2, 3, 4, 10
<b>4</b>	10	10 groups of 2,3,4,5
	<b>100</b>	
<b>5a</b>	10	Double (numbers 10 – 30)
<b>5a</b>	10	Double (ten multiples from 10 – 50)
<b>5a</b>	10	Double (5 multiples from 5 – 40)
<b>5a</b>	10	2 groups of (numbers 1-10)
<b>5a</b>	10	3 groups of 2, 3, 4, 5, 10
<b>5a</b>	10	4 groups of 2, 3, 4, 5, 10
<b>5a</b>	10	5 groups of 2, 3, 4, 5, 10
<b>5a</b>	5	6 groups of 2, 10
<b>5a</b>	10	10 groups of 2, 3, 4, 5, 6, 7, 8
<b>5a</b>	10	Use x symbol – 2 x (numbers 1 – 10)
<b>5a</b>	5	(3, 4, 5) x 2
	<b>100</b>	

<b>5b</b>	10	Double (ten multiples from 10 – 50)
<b>5b</b>	5	Double (5 multiples from 5 – 50)
<b>5b</b>	5	2 groups of (numbers 1-10)
<b>5b</b>	5	3 groups of 2, 3, 4, 5, 10
<b>5b</b>	5	4 groups of 2, 3, 4, 5, 10
<b>5b</b>	5	5 groups of 2, 3, 4, 5, 10
<b>5b</b>	5	6 groups of 2, 5, 10
<b>5b</b>	10	10 groups of 2, 3, 4, 5, 6, 7, 8, 9
<b>5b</b>	10	Use x symbol – 2 x (numbers 1 – 10)
<b>5b</b>	10	Use x symbol – 3 x (1, 2, 3, 4, 5, 10)
<b>5b</b>	10	Use x symbol – 5 x (numbers 1 – 5)
<b>5b</b>	10	Use x symbol – 10 x (numbers 1 – 5)
	<b>100</b>	
<b>5c</b>	10	Double (numbers 30 – 50)
<b>5c</b>	5	Double (ten multiples from 10 – 50)
<b>5c</b>	5	Double (5 multiples from 5 – 50)
<b>5c</b>	5	Double (100 multiples from 100 – 400)
<b>5c</b>	5	2 times (numbers 0-10)
<b>5c</b>	5	3 times (numbers 0-10)
<b>5c</b>	5	4 times (numbers 0-10)
<b>5c</b>	5	5 times (numbers 0-10)
<b>5c</b>	5	6 times(0,1, 2, 3, 4, 5, 10)
<b>5c</b>	5	10 times (numbers 0-9)
<b>5c</b>	5	Use x symbol – 2 x (numbers 0 – 10)
<b>5c</b>	7	Use x symbol – 3 x (0, 1, 2, 3, 4, 5, 10)
<b>5c</b>	8	Use x symbol – 4 x (numbers 0 – 10)
<b>5c</b>	10	Use x symbol – 5 x (numbers 0 – 5)
<b>5c</b>	5	Use x symbol – 6 x (numbers 0 – 5)
<b>5c</b>	10	Use x symbol – 10 x (numbers 0 – 10)
	<b>100</b>	

<b>6a</b>	5	0 x (numbers 0 – 10)
<b>6a</b>	7	Double (100 multiples from 100 – 1000)
<b>6a</b>	15	Use symbols to represent an unknown number in any position in a multiplication sentence (numbers 0 – 7) x (numbers 0 – 10) eg $3 \times ? = 12$ $? \times 4 = 12$ $3 \times 4 = ?$
<b>6a</b>	15	Multiply (numbers 0 – 7) by (numbers 0-10)
<b>6a</b>	15	Product of (numbers 0 – 7) and (numbers 0-10)
<b>6a</b>	20	Use x symbol – (numbers 0 -7) x (numbers 0 – 10)
<b>6a</b>	12	(2-digit number) x 10
<b>6a</b>	11	(10 multiples 0-90) x (numbers 0 - 7)
	<b>100</b>	
<b>6b</b>	7	0 x (numbers 0 – 10)
<b>6b</b>	7	Double (10 multiples from 100 – 500) eg Double 460
<b>6b</b>	13	Use symbols to represent an unknown number in any position in a multiplication sentence (numbers 0 – 7) x (numbers 0 – 10)
<b>6b</b>	10	Multiply (numbers 0 – 9) by (numbers 0-10)
<b>6b</b>	10	Product of (numbers 0 – 9) and (numbers 0-10)
<b>6b</b>	23	Use x symbol – (numbers 0 -9) x (numbers 0 – 10)
<b>6b</b>	10	(2-digit number) x 10
<b>6b</b>	8	(2-digit number) x 100
<b>6b</b>	7	(3-digit number) x 10
<b>6b</b>	5	(10 multiples 0-90) x (numbers 0 - 7)
	<b>100</b>	
<b>6c</b>	5	0 x (numbers 0 – 10)
<b>6c</b>	7	Double (10 multiples from 100 – 500) eg Double 460
<b>6c</b>	13	Use symbols to represent an unknown number in any position in a multiplication sentence (numbers 0 – 7) x (numbers 0 – 10)
<b>6c</b>	7	Multiply (numbers 0 – 9) by (numbers 0-10)
<b>6c</b>	8	Product of (numbers 0 – 9) and (numbers 0-10)
<b>6c</b>	15	Use x symbol – (numbers 0 -9) x (numbers 0 – 10)
<b>6c</b>	8	(2-digit number) x 10
<b>6c</b>	8	(2-digit number) x 100
<b>6c</b>	7	(3-digit number) x 10
<b>6c</b>	5	(3-digit 100 multiples) x (numbers 2-9) eg $400 \times 3$
<b>6c</b>	10	(10 multiples 0-90) x (numbers 0 - 7)
<b>6c</b>	7	(2-digit number) x (number 2-9) no regrouping eg $11 \times 9$ , $23 \times 3$ , $32 \times 4$
	<b>100</b>	



<b>7a</b>	5	0 x (numbers 0 – 10)
<b>7a</b>	7	Double (10 multiples from 100 – 900) eg Double 680
<b>7a</b>	13	Use symbols to represent an unknown number in any position in a multiplication sentence (numbers 0 – 7) x (numbers 0 – 10) eg $3 \times ? = 12$ $? \times 4 = 12$ $3 \times 4 = ?$
<b>7a</b>	8	Multiply (numbers 4 – 9) by (numbers 0-10)
<b>7a</b>	7	Product of (numbers 4 – 9) and (numbers 0-10)
<b>7a</b>	15	Use x symbol – (numbers 4 -9) x (numbers 0 – 10)
<b>7a</b>	8	(2- or 3-digit number) x 10
<b>7a</b>	7	( 2- or 3-digit number) x 100
<b>7a</b>	5	(3-digit 100 multiple) x (numbers 2-9) eg $400 \times 3$
<b>7a</b>	5	(4-digit 1000 multiple) x (numbers 2-9) eg $4000 \times 9$
<b>7a</b>	10	(10 multiples 0-90) x (numbers 5-10)
<b>7a</b>	10	(2-digit number) x (number 2-9) no regrouping eg $11 \times 9$ , $23 \times 3$ , $32 \times 4$
	<b>100</b>	
<b>7b</b>	5	**Double (10 multiples from 100 – 900) eg Double 680
<b>7b</b>	5	Use symbols to represent an unknown number in any position in a multiplication sentence (numbers 0 – 7) x (numbers 0 – 10) eg $3 \times ? = 12$ $? \times 4 = 12$ $3 \times 4 = ?$
<b>7b</b>	5	(3-digit 100 multiple) x (numbers 2-9) eg $400 \times 3$
<b>7b</b>	5	(4-digit 1000 multiple) x (numbers 2-9) eg $4000 \times 9$
<b>7b</b>	5	(2-digit number) x (number 2-9) no regrouping eg $11 \times 9$ , $23 \times 3$ , $32 \times 4$
<b>7b</b>	10	Product of (numbers 4 – 9) and (numbers 0-10)
<b>7b</b>	5	0 x (numbers 0 – 20)
<b>7b</b>	10	Product of (2-digit 10 multiple) and (numbers 4-10) eg 40 and 9
<b>7b</b>	10	Multiply (2-digit 10 multiple) by (numbers 4-10) 70 by 6
<b>7b</b>	10	(2-digit number) x 1000
<b>7b</b>	10	(2-digit number) x (number 2-9) with regrouping eg $17 \times 9$ , $23 \times 7$ , $32 \times 9$
<b>7b</b>	10	(2-digit 10 multiple) x (2-digit 10 multiple) eg $60 \times 50$
<b>7b</b>	10	(3-digit 100 multiple) x (2-digit 10 multiple) eg $400 \times 30$
	<b>100</b>	

**8** 10 (2-digit number) x (number 2-9) with regrouping eg 17x9, 23x7, 32x9  
**8** 5 (2-digit 10 multiple) x (2-digit 10 multiple) eg 60 x 50  
**8** 5 (3-digit 100 multiple) x (2-digit 10 multiple) eg 400 x 30  
**8** 5 (numbers 1-100) x (numbers 0 or 1)  
**8** 10 Product of (numbers 4-10) and (2-digit 10 multiple) (7 and 50)  
**8** 10 Multiply (numbers 4-10) by (2-digit 10 multiple)  
**8** 10 Product of (numbers 4-10) and (3-digit 100 multiple)  
**8** 10 Multiply (numbers 4-10) by (3-digit 100 multiple)  
**8** 10 (4-digit 100 multiple) x (numbers 2-9) eg 5400 x 3  
**8** 10 (3-digit number) x 1000  
**8** 10 (3-digit 10 multiple) x (numbers 3-10) eg 140 x 8

**100**

**9** 3 (numbers 1-100) x (numbers 0 or 1)  
**9** 7 (4-digit 100 multiple) x (numbers 2-9) eg 5400 x 3  
**9** 7 (3-digit 10 multiple) x (numbers 3-10) eg 140 x 8  
**9** 10 (2-digit number) x (11, 12) eg 37 x 11, 59 x 12  
**9** 8 (4-digit 50 multiple) x (2-digit 10 multiple) 6850 x 40  
**9** 8 Product of (numbers 4-10) and (2-digit 10 multiple)  
**9** 8 Multiply (numbers 4-10) by (2-digit 10 multiple)  
**9** 8 Product of (numbers 4-10) and (3-digit 100 multiple)  
**9** 8 (numbers 4-10) x (3-digit 100 multiple) eg 7 x 400  
**9** 8 (4-digit 100 multiple) x (numbers 2-9) eg 5400 x 3  
**9** 5 (3-digit number) x 1000  
**9** 5 (3-digit 10 multiple) x (numbers 3-10) eg 140 x 8  
**9** 5 (3-digit 10 multiple) x (2-digit 10 multiple) eg 670 x 80  
**9** 10 (3-digit number) x (number 2-10) with regrouping eg 345 x 7

**100**

<b>10</b>	5	(4-digit 50 multiple) x (2-digit 10 multiple) eg 6850 x 40
<b>10</b>	7	(4-digit 100 multiple) x (numbers 2-9) eg 5400 x 3
<b>10</b>	7	(3-digit 10 multiple) x (2-digit 10 multiple) eg 670 x 80
<b>10</b>	5	(3-digit number) x (number 2-10) with regrouping eg 345 x 7
<b>10</b>	7	(3-digit number) x (11, 12) eg 357 x 11, 598 x 12
<b>10</b>	8	(4-digit 10 multiple) x (number 3-9) eg 4560 x 6
<b>10</b>	11	(4-digit number) x (number 2-9) with regrouping
<b>10</b>	8	(3-digit 100 multiple) x (3-digit 100 multiple) eg 400 x 300
<b>10</b>	7	(4-digit 10 multiple) x (2-digit 10 multiple) eg 3550 x 90
<b>10</b>	7	(4-digit 100 multiple) x (2-digit 10 multiple) eg 3700 x 50
<b>10</b>	8	(4-digit 1000 multiple) x (2-digit 10 multiple) eg 4000 x 90
<b>10</b>	8	(4-digit 1000 multiple) x (3-digit 10 multiple) eg 4000 x 190
<b>10</b>	7	(4-digit 1000 multiple) x (3-digit 100 multiple) eg 4000 x 900
	<b>100</b>	

## Extension Division

4	50	Half of (even numbers 2 – 20)
4	20	Divide (even numbers 2-20) by 2
4	10	Half of (10 multiples 20, 40, 60, 80)
4	10	(2 lines) How many 2s? Next line: (even number 2-20)
4	10	(2 lines) How many 10s? Next line: (10 multiple 10-100)
	<b>100</b>	
<b>5a</b>	25	Half of (even numbers 2 – 30)
<b>5a</b>	10	Half of (twenty multiples 10 – 100)
<b>5a</b>	15	Divide (even numbers 2-30) by 2
<b>5a</b>	6	How many 3s? (numbers 6,15,30)
<b>5a</b>	6	Divide (6,15,30) by 3
<b>5a</b>	6	How many 4s? (numbers 8,20,40)
<b>5a</b>	6	Divide (8,20,40) by 4
<b>5a</b>	6	How many 5s? (numbers 10, 15, 20, 50)
<b>5a</b>	6	Divide (10,15,20,50) by 5
<b>5a</b>	8	How many 10s? (numbers 20,30,40,50)
<b>5a</b>	6	Divide (20,30,40,50) by 10
	<b>100</b>	
<b>5b</b>	7	Half of (even numbers 20 – 60)
<b>5b</b>	8	Half of (ten multiples from 0 – 200)
<b>5b</b>	8	(even numbers 2-100) $\div$ 2 (use symbol)
<b>5b</b>	5	How many 3s? (numbers 6, 9, 12, 15, 30)
<b>5b</b>	5	Divide (6, 9, 12, 15, 30) by 3
<b>5b</b>	6	Use $\div$ symbol (numbers 6, 9, 12, 15, 30) $\div$ 3
<b>5b</b>	5	How many 4s? (numbers 8, 12,16, 20, 40)
<b>5b</b>	6	Divide (8, 12,16, 20, 40) by 4
<b>5b</b>	7	Use $\div$ symbol (numbers 8, 12, 16, 20, 40) $\div$ 4
<b>5b</b>	6	How many 5s? (numbers 10, 15, 20, 25, 50)
<b>5b</b>	6	Divide (10, 15, 20, 25, 30, 50) by 5
<b>5b</b>	6	Use $\div$ symbol (numbers 10, 15, 20, 25, 30, 50) $\div$ 5
<b>5b</b>	6	How many 6s?(numbers 12, 60)

<b>5b</b>	2	Divide (12, 60) by 6
<b>5b</b>	2	Use ÷ symbol (12, 60) ÷ 6
<b>5b</b>	8	How many 10s?(numbers 20, 30, 40, 50, 60, 70, 80, 90)
<b>5b</b>	7	Use ÷ symbol (10 multiples 20 - 90) ÷ 10
	<b>100</b>	
<b>5c</b>	10	(3-digit 10 multiple) ÷ 10 eg 450 ÷ 10
<b>5c</b>	10	Divide (even numbers 40 – 100) by 2
<b>5c</b>	10	Half of (20 multiples from 100 – 200)
<b>5c</b>	10	Half of (numbers 10, 30, 50, 70, 90)
<b>5c</b>	10	(200, 400, 600, 800, 1000) ÷ 2
<b>5c</b>	10	How many 3's? (6, 9, 12, 15, 30)
<b>5c</b>	10	How many 4's?(8, 12, 16, 20, 40)
<b>5c</b>	10	How many 5s? (10, 15, 20, 25, 30, 50)
<b>5c</b>	10	How many 6s?(12, 30, 60)
<b>5c</b>	10	How many 10s? (20, 30, 40, 50, 60, 70, 80, 90, 100)
	<b>100</b>	
<b>6a</b>	7	Use symbols to represent an unknown number in any position in a division sentence (numbers 0 – 50) ÷ (numbers 1 – 5) (integer answers) eg $12 \div ? = 4$ $? \div 4 = 3$ $12 \div 3 = ?$
<b>6a</b>	5	(numbers 0 - 10) ÷ 1
<b>6a</b>	5	(4-digit 1000 multiple) ÷ 10
<b>6a</b>	5	(4-digit 1000 multiple) ÷ 100
<b>6a</b>	10	(200, 400, 600, 800, 1000) ÷ 10
<b>6a</b>	10	Half of (even numbers 60 – 150)
<b>6a</b>	5	Half of (10 multiples from 100 – 200)
<b>6a</b>	5	Half of (2000, 4000, 6000, 8000, 10 000)
<b>6a</b>	3	Divide (100 multiples from 200 – 1000) by 2
<b>6a</b>	7	(3 multiples 0 - 30) ÷ 3
<b>6a</b>	8	(4 multiples 0 - 40) ÷ 4
<b>6a</b>	10	(5 multiples 0 - 50) ÷ 5
<b>6a</b>	10	(0, 6, 12, 18, 24, 30, 60) ÷ 6
<b>6a</b>	10	(10 multiples 0 - 200) ÷ 10
	<b>100</b>	

<b>6b</b>	12	Half of (100 multiples from 200 – 1800)
<b>6b</b>	13	Half of (1000 multiples 1000 - 5000)
<b>6b</b>	15	Use symbols to represent an unknown number in any position in a division sentence (numbers 0 – 60) ÷ (numbers 1 – 6) (integer answers) eg $12 \div ? = 4$ $? \div 4 = 3$ $12 \div 3 = ?$
<b>6b</b>	15	(numbers 0 – 70) ÷ (numbers 0-10) - integer answers
<b>6b</b>	10	How many 6s? (6 multiples 0 - 60)
<b>6b</b>	10	How many 9s? (9, 18, 27, 36, 45, 54, 63, 90)
<b>6b</b>	10	How many 7s? (7 multiples 0 - 70)
<b>6b</b>	10	(4-digit 1000 multiple) ÷ (10 or 100)
	<b>100</b>	
<b>6c</b>	5	(numbers 0 – 50) ÷ 1
<b>6c</b>	10	Half of (10 multiples from 100 – 2000) eg Half of 460
<b>6c</b>	15	Use symbols to represent an unknown number in any position in a division sentence (numbers 0 – 70) ÷ (numbers 1 – 7) (integer answers) eg $12 \div ? = 4$ $? \div 4 = 3$ $12 \div 3 = ?$
<b>6c</b>	25	(numbers 0 – 90) ÷ (numbers 0-10) - integer answers
<b>6c</b>	8	How many 8s? (8 multiples 0 - 80)
<b>6c</b>	7	(3- or 4-digit 10 multiple) ÷ 10
<b>6c</b>	10	(numbers 20 - 1000) ÷ (numbers 3-9) so answer is a 2-digit 10 multiple eg $320 \div 8$ , $450 \div 5$
<b>6c</b>	5	(numbers 1000 - 10 000) ÷ (numbers 3-9) so answer is a 3-digit 100 multiple eg $3200 \div 8$ , $4500 \div 5$
<b>6c</b>	10	(3-digit number) ÷ (numbers 3-9) - integer answer eg $132 \div 4$
<b>6c</b>	5	(4- or 5-digit 100 multiple) ÷ (10 or 100)
	<b>100</b>	
<b>7a</b>	10	(3-digit number) ÷ (numbers 3-9) - integer answer eg $132 \div 4$
<b>7a</b>	5	(numbers 0 – 50) ÷ 1
<b>7a</b>	8	(4- or 5-digit 100 multiple) ÷ (10 or 100)
<b>7a</b>	15	Use symbols to represent an unknown number in any position in a division sentence
<b>7a</b>	8	(numbers 20 - 1000) ÷ (numbers 3-9) so answer is a 2-digit 10 multiple eg $320 \div 8$ , $450 \div 5$
<b>7a</b>	9	(numbers 1000 - 10 000) ÷ (numbers 3-9) so answer is a 3-digit 100 multiple eg $3200 \div 8$ , $4500 \div 5$
<b>7a</b>	9	How many 6s? (6 multiples 0 - 60)
<b>7a</b>	9	How many 7s? (7 multiples 0 - 70)
<b>7a</b>	9	How many 8s? (8 multiples 0 - 80)
<b>7a</b>	9	How many 9s? (9 multiples 0 - 90)
<b>7a</b>	9	(100 multiples 100 - 1000) ÷ 50
	<b>100</b>	

<b>7b</b>	5	(numbers 0 – 100) ÷ 1
<b>7b</b>	10	Use symbols to represent an unknown number in any position in a division sentence (numbers 0 – 100) ÷ (numbers 1 – 10) (integer answers) eg $12 \div ? = 4$ $? \div 4 = 3$ $12 \div 3 = ?$
<b>7b</b>	20	(3-digit number) ÷ (numbers 3-9) - integer answer eg $132 \div 4$
<b>7b</b>	5	Use symbols to represent an unknown number in any position in a division sentence (numbers 0 – 100) ÷ (numbers 1 – 10) (integer answers) eg $12 \div ? = 4$ $? \div 4 = 3$ $12 \div 3 = ?$
<b>7b</b>	10	Half of (10 multiples from 1000 – 10 000) eg Half of 6880
<b>7b</b>	10	A quarter of (40 multiples from 500 – 1000) eg A quarter of 440 (answer a ten multiple)
<b>7b</b>	12	(3-digit 10 multiple) ÷ (2-digit 10 multiple) so answer is a whole number eg $360 \div 90$ , $560 \div 80$
<b>7b</b>	7	(2- or 3-digit 11 multiples) ÷ 11
<b>7b</b>	8	(2- or 3-digit 12 multiples) ÷ 12
<b>7b</b>	5	(100 multiples 100 - 1000) ÷ 50
<b>7b</b>	5	(2-digit odd numbers) ÷ 2 (decimal answer)
	<b>100</b>	
<b>8</b>	10	Half of (10 multiples from 1000 – 10 000) eg Half of 6880
<b>8</b>	10	A quarter of (40 multiples from 500 – 1000) eg A quarter of 440 (answer a ten multiple)
<b>8</b>	5	(3-digit 10 multiple) ÷ (2-digit 10 multiple) so answer is a whole number not greater than 10 eg $360 \div 90$ , $560 \div 80$
<b>8</b>	5	Use symbols in any position in division sentence (3-digit 10 multiple) ÷ (2-digit 10 multiple) so answer is a whole number eg $360 \div 90$ , $560 \div 80$
<b>8</b>	10	(3-digit number) ÷ (numbers 3-9) - integer answer eg $132 \div 4$
<b>8</b>	10	(4-digit 100 multiple) ÷ (3-digit 100 multiple) so answer is a whole number eg $3600 \div 900$ , $5600 \div 800$
<b>8</b>	10	(4-digit 100 multiple) ÷ (2-digit 10 multiple) so answer is a 2-digit 10 multiple eg $3600 \div 90$ , $5600 \div 80$
<b>8</b>	10	(3- digit 11 multiples) ÷ 11
<b>8</b>	10	(3-digit 12 multiples) ÷ 12
<b>8</b>	5	(100 multiples 100 - 1000) ÷ 50
<b>8</b>	5	(100 multiples 100 - 1000) ÷ 25
<b>8</b>	5	(2-digit odd numbers) ÷ 2 (decimal answer)
<b>8</b>	5	(2-digit numbers) ÷ 10 (decimal answer)
	<b>100</b>	
<b>9</b>	9	(3-digit number) ÷ (numbers 3-9) - integer answer eg $132 \div 4$
<b>9</b>	9	(3-digit 10 multiple) ÷ (2-digit 10 multiple) so answer is a whole number eg $360 \div 90$ , $560 \div 80$
<b>9</b>	5	(4-digit 100 multiple) ÷ (3-digit 100 multiple) so answer is a whole number eg $3600 \div 900$ , $5600 \div 800$
<b>9</b>	9	(4-digit 100 multiple) ÷ (2-digit 10 multiple) so answer is a 2-digit 10 multiple eg $3600 \div 90$ , $5600 \div 80$
<b>9</b>	5	Use symbol in any position in division sentence (4-digit 100 multiple) ÷ (2-digit 10 multiple)

- so answer is a 2-digit 10 multiple eg  $3600 \div 90$ ,  $5600 \div 80$
- 9** 8 (5-digit 100 multiple)  $\div$  (3-digit 100 multiple) so answer is a 2-digit 10 multiple eg  $36\ 000 \div 900$ ,  $56\ 000 \div 800$
- 9** 10 (3- or 4-digit 110 multiples)  $\div$  11
- 9** 10 (3- or 4-digit 120 multiples)  $\div$  12
- 9** 10 (3- or 4-digit 50 multiples)  $\div$  50 eg  $650 \div 50$ ,  $6500 \div 50$
- 9** 10 (100 multiples 500 - 5000)  $\div$  25
- 9** 5 (1- or 2-digit integers)  $\div$  0.1
- 9** 10 (5-digit 100 multiple)  $\div$  (3-digit 100 multiple) so answer is a 2-digit 10 multiple eg  $36\ 000 \div 900$ ,  $56\ 000 \div 800$
- 100**
- 10** 5 (3-digit number)  $\div$  (numbers 3-9) - integer answer eg  $132 \div 4$
- 10** 8 Use symbol in any position in division sentence (3-digit 100 multiple)  $\div$  (numbers 3-9) integer answer eg  $132 \div ? = 33$ ,  $? \div 4 = 33$
- 10** 5 (3-digit 10 multiple)  $\div$  (2-digit 10 multiple) so answer is a whole number eg  $360 \div 90$ ,  $560 \div 80$
- 10** 8 Use symbol in any position in division sentence (3-digit 10 multiple)  $\div$  (2-digit 10 multiple)  
so answer is a whole number eg  $360 \div ? = 90$ ,  $? \div 40 = 90$
- 10** 5 (4-digit 100 multiple)  $\div$  (3-digit 100 multiple) so answer is a whole number eg  $3600 \div 900$ ,  $5600 \div 800$
- 10** 5 Use symbol in any position in division sentence (4-digit 100 multiple)  $\div$  (3-digit 10 multiple)  
so answer is a whole number eg  $3600 \div ? = 900$ ,  $? \div 900 = 4$
- 10** 5 (4-digit 100 multiple)  $\div$  (2-digit 10 multiple) so answer is a 2-digit 10 multiple eg  $3600 \div 90$ ,  $5600 \div 80$
- 10** 5 Use symbol in any position in division sentence (4-digit 100 multiple)  $\div$  (2-digit 10 multiple)  
so answer is a 2-digit 10 multiple eg  $3600 \div 90$ ,  $5600 \div 80$
- 10** 8 (5-digit 100 multiple)  $\div$  (3-digit 100 multiple) so answer is a 2-digit 10 multiple eg  $36\ 000 \div 900$ ,  $56\ 000 \div 800$
- 10** 8 (3- or 4-digit 110 multiples)  $\div$  11
- 10** 8 (3- or 4-digit 120 multiples)  $\div$  12
- 10** 10 (3- or 4-digit 50 multiples)  $\div$  50 eg  $650 \div 50$ ,  $6500 \div 50$
- 10** 10 (100 multiples 500 - 5000)  $\div$  25
- 10** 10 (1- or 2-digit integers)  $\div$  0.1
- 100**



## Decimal +/-

Note: All dec nums with no units are written as 0.67 etc but players can enter both answers eg .67 or 0.67

6a	25	Addition of tenths answer less than 1.0 eg $0.2+0.4$
6a	25	1 subtract tenths. eg $1 - 0.4$
6a	25	Add tenths totaling 1 eg $0.6 + ?=1$ , or $.6 + ? = 1$ but not 1.0
6a	25	Subtraction of tenths eg $0.4 - 0.3$
	<b>100</b>	
6b	12	Addition of tenths answer can be $>1.0$ eg $0.8 + 0.4$
6b	12	1.0 subtract tenths. eg $1.0 - 0.4$
6b	12	Questions of type $1.0 - 0.3$ , $1.0 - 0.6$ etc
6b	12	Questions of type $2.6-1.3$ , (numbers $<10$ ), no decomposition
6b	10	Add tenths totaling 1 eg $0.6 + ?=1$ or 1.0
6b	10	Add 0.1 to any 1- or 2-digit number. eg $2+0.1$ , $3.4+0.1$ , $0.67+0.1$
6b	10	Number $<10$ , 1 dec pl subtract whole number eg $7.5 - 4$
6b	12	Questions of type $2.4 + 0.3$ , no crossing
6b	10	Questions of type $3.2 + 2.4$ , no crossing
	<b>100</b>	
7a	6	Add 0.01 to any positive integer. eg $6 + 0.01$
7a	6	Add 2 numbers each with 2 dec pl, no crossing boundaries eg $0.42+0.34$
7a	6	Questions of type $2.6-1.3$ , no decomposition
7a	6	Whole number subtract tenths eg $4 - 0.3$
7a	5	How many tenths to next whole number eg $3.4+ ? = 4$ (or 4.0)
7a	6	Decimals (2DP) totaling 1 eg $0.45 + ? = 1$ (or 1.0)
7a	6	Subtract 0.1 from number $<10$ with 1 or 2 dec pl, no decomposition eg $3.2-0.1$ , $0.25 - 0.1$
7a	6	Subtract 2 dec pl numbers, no decomposition eg $0.34 - 0.21$
7a	6	Number $<10$ , 1 dec pl subtract whole number eg $7.5 - 4$
7a	6	Number $<10$ , 2 dec pl subtract whole number eg $7.54 - 4$
7a	6	Subtract 0.1 from any 2 or 3 digit number (can be W, W/T, W/TH) eg $140 - 0.1$ , $14 - 0.1$ , $11.4 - 0.1$ , $1.14 - 0.1$
7a	6	Decimals (1DP) totaling 10 eg $2.3 + ? = 10$
7a	5	Subtract 0.01 from any number ( $<100$ ) with 2 decimal places. No decomposition eg $12.78 - 0.01$
7a	6	Questions of type $2.4 + .8$ , crossing boundary

7a	6	Addition of nums <10 with 1 dec pl , regrouping OK eg 2.7 +1.8
7a	6	Questions of type 2.0 +0.3 whole number is <10, tenths
7a	6	Questions of type 5+2.4, 2.4 +5 Dec number <10, tenths
	<b>100</b>	
7b	8	Add 0.001 to any number(<10) with 3 decimal places eg 6.807+0.001, 7.569+0.001 (accept 7.57 or 7.570)
7b	8	Subtract 0.01 from any positive integer. eg 6 - 0.01
7b	9	Any 2 digit (w/t) - any 1 or 2 digit, same num dec pl, crossing boundary eg 4.7 - 1.9, 4.3 -0.5 not 4.7 -0.18
7b	9	Any 2 digit subtract any 2 digit eg 4.2-.24, 5.6 - 1.7, 23-.15 etc, including decomposition
7b	9	Any 2 or 3 digit (w/th or th) - any 1 or 2 digit, crossing boundary eg 0.47 - 0.29, 1.32 - 0.95, always include 0
7b	8	Subtract 0.1 from any 3-digit number. No decomposition eg 12.7-0.1, 2.34-0.1, 0.675 - 0.1
7b	8	Add 0.01 to any number with 2 decimal places. number<100 eg 23.78+0.01
7b	9	Any 2 digit subtract any 2 digit eg 4.2-.24, 5.6 - 1.7, 23-.15 etc
7b	8	Addition of whole number and tenths eg 2 + 0.5 also 2.0 + 0.5
7b	8	Subtract whole number from any 1 or 2 dec pl number (<100), decomposition OK eg 21.4 -17
7b	8	Questions of type 2.7 +1.8, 2.8+ 0.7, with regrouping in tenths place
7b	8	Questions of type 7.5 +4.2, with regrouping in units place
	<b>100</b>	
8a	9	Subtract 0.001 from any number with 3 dec pl eg 4.502 - 0.001
8a	9	Add 0.001 to any number with 3 dec pl eg 4.502 + 0.001
8a	9	Decimals (2DP) totaling 10 eg 2.67 + ? = 10
8a	9	Decimals (3DP) totaling 1 eg 0.678 + ? = 1
8a	9	Make next whole number from number with units, tenths and hundredths eg 2.74 + ? = 3.0
8a	9	Add 0.1 to any 3-digit number.
8a	10	Addition of nums <10 with 1 dec pl , regrouping OK eg 2.7 +1.8
8a	9	Add whole num (<20) to any number (max 4 digits, 1,2 or 3 dec pl) eg 114.3+17, 11.43=17, 1.143 +17
8a	9	Subtract whole number (<20) from any number (max 4 digits with 1,2 or 3 dec pl) eg 114.3 -17, 11.43 -7, 10.685 -4
8a	9	Questions of type 7.5 +3.7, Nums <10, 1 dec pl, regrouping allowed
8a	9	Questions of type 5.6+2.4, answer a whole number. Accept 8 or 8.0
	<b>100</b>	

<b>8b</b>	20	Subtract 0.01 from any number (<1000) with 1 dec pl eg 4.5 - 0.01
<b>8b</b>	20	Subtract numbers (<30) with 3 dec pl, no decomposition eg 14.786 - 12.654
<b>8b</b>	20	Any 2 digit subtract any 2 digit eg 4.2-.24, 5.6 - 1.7, 23-.15 etc
<b>8b</b>	20	Subtract 0.001 from any number (<100) with 2 dec pl eg 4.56 - 0.001, 17.86 - 0.001
<b>8b</b>	20	Subtract whole number from any 1 or 2 dec pl number (<1000) eg 17.45 -11, 147.33 - 139
	<b>100</b>	
<b>9</b>	14	Make next whole number from number (<10) with 3 dec pl) eg 2.345+? = 3
<b>9</b>	13	Subtract numbers (<30) with 3 dec pl, no decomposition eg 14.786 - 12.654
<b>9</b>	14	Decimals (3DP) totaling 10 eg 8.126 + ? = 10
<b>9</b>	15	Add any 2 or 3 digit number to any 2 digit number, at least one dec pl in at least one of numbers eg 0.12+17, 1.7 +1.2, 0.17 +0.123 etc
<b>9</b>	15	1,2 or 3 digits. Dec point anywhere eg .4+32, 4.5 +.24, 1.23+12.3 etc
<b>9</b>	14	Addition: 4 digits with 1 or 2 dec places eg 12.35 +145.8
<b>9</b>	15	Subtraction: 4 digits 1 or 2 dec places eg 34.56 - 23.7
	<b>100</b>	
<b>10</b>	25	3 digit subtract (1,2 or 3 digit), including decomposition eg 54.6 -12.9
<b>10</b>	25	Add any 3 digit to any 1,2 or 3 digit, at least 1 dec pl in at least one number eg 123+0.7, 1.23+7.5, 123+0.75, 12.3 + 0.758
<b>10</b>	25	(1 or 2 digits with 1,2 or 3 dec pl) + (1 or 2 digits with 1 or 2 dec pl)
<b>10</b>	25	(1 or 2 digits with 1,2 or 3 dec pl) - (1 or 2 digits with 1 or 2 dec pl)
	<b>100</b>	

## Decimal x/÷

**Note: All dec nums with no units are written as 0.67 etc but players can enter both answers eg .67 or 0.67**

<b>6a</b>	25	Divide odd numbers by 2, up to 10
<b>6a</b>	25	Divide 1 dec pl "even" nums by 2 eg 0.6/2
<b>6a</b>	25	Multiply tenths by 2, no crossing boundary eg 0.3x2
<b>6a</b>	25	Multiply tenths by 10 eg 0.4 x10 or 10 x 0.4
	<b>100</b>	
<b>6b</b>	20	Divide odd numbers by 2, up to 20
<b>6b</b>	20	Multiply tenths by 2 or 3, with crossing of boundary eg 0.7x2, 0.6x3
<b>6b</b>	20	Divide 2 digit decimal numbers by 2, each digit divisible by 2 eg 4.8 divided by 2
<b>6b</b>	20	Divide whole number (< 10) by 10 eg 4/10
<b>6b</b>	20	Multiply tenths by 100, eg 0.6 x100 or 100 x 0.6
	<b>100</b>	
<b>7a</b>	20	Divide odd numbers by 2, up to 50
<b>7a</b>	20	Divide 2 digit decimal numbers by 2, digits can be odd or even eg 4.8 divided by 2, 4.5 divided by 2
<b>7a</b>	20	Multiply any decimal number(<100) with 1 decimal place by 10. eg 56.4
<b>7a</b>	20	Divide whole number (< 100) by 10 eg 43/10
<b>7a</b>	20	Multiply a 2 digit whole number by 0.1 eg 54 x 0.1
	<b>100</b>	
<b>7b</b>	6	Half of number 1-100
<b>7b</b>	8	Doubles of all 2-digit numbers including decimal numbers with tenths and decimal hundredths.
<b>7b</b>	8	Multiply a decimal tenth by any single-digit number (0.6x9)
<b>7b</b>	8	Multiply any decimal number(<100) with 1 decimal place by 100.
<b>7b</b>	8	Multiply any decimal number (<100) with 2 decimal places by 10.
<b>7b</b>	8	Multiply whole numbers (<10) by 0.1 eg 6x0.1
<b>7b</b>	8	Multiply whole numbers (<10) by 0.01
<b>7b</b>	8	Multiply decimal numbers (<100) by 0.1
<b>7b</b>	8	Divide whole number (< 10) by 100 eg 4/100
<b>7b</b>	8	Divide whole number (< 100) by 100 eg 43/100
<b>7b</b>	8	Multiply a 3 digit whole number by 0.1 eg 764x0.1

<b>7b</b>	7	Multiply a 3 digit whole number by 0.01 eg 516 x 0.01
<b>7b</b>	7	Multiply a 4 digit whole number by 0.1 eg 4832 x 0.1
	<b>100</b>	
<b>8a</b>	15	All tenths times tables e.g. 0.3 x 0.4
<b>8a</b>	15	Multiply single digit whole number by decimal tenth eg 9x0.6
<b>8a</b>	12	Multiply any decimal number (<100) with 2 decimal places by 100.
<b>8a</b>	10	Divide whole numbers (<10) by 0.1
<b>8a</b>	12	Multiply whole numbers (<100) by 0.01
<b>8a</b>	12	(0.01 to 0.09)x(1 to 9) eg 0.07 x5, also 5 x 0.07
<b>8a</b>	12	Multiply a 4 digit whole number by 0.01 eg 1865x0.01
<b>8a</b>	12	Multiply a 4 digit whole number by 0.001 eg 7483x0.001
	<b>100</b>	
<b>8b</b>	20	Multiply a 2-digit number (including a decimal) by any single digit number
<b>8b</b>	20	Multiply any decimal number(<10) with 1 decimal place by whole number <10 eg 7.6*4
<b>8b</b>	20	Divide number (<10) with 1 dec place by 5 eg 4.3 divided by 5
<b>8b</b>	20	Divide whole number <100 by 0.1 eg 9div0.1, 56 div 0.1
<b>8b</b>	20	Multiply a 2 digit whole number by 0.01 eg 76x0.01
	<b>100</b>	
<b>9</b>	10	Divide whole numbers (<10) by 0.01
<b>9</b>	12	Multiply decimal numbers (<100) by 0.01
<b>9</b>	15	Mixed tenths and hundredths times tables (0.9 x 0.04)
<b>9</b>	12	Divide decimal numbers (<100) by 0.1
<b>9</b>	13	Multiply 2 digit decimal numbers by 5
<b>9</b>	13	Multiply 2 digit decimal numbers by 2
<b>9</b>	13	Multiply 2 digit decimal numbers by 4
<b>9</b>	12	Multiply a 3 digit whole number by 0.001 eg 476x0.001
	<b>100</b>	
<b>10</b>	50	Divide decimal numbers ( up to 2 dec pl , but less than 100) by 0.01 eg 12.43 / 0.01
<b>10</b>	50	Multiply 2 digit decimal numbers by any whole number in range 2 - 9
	<b>100</b>	

## Fractions

<b>4</b>	50	Half (the word) of any even whole number up to 20
<b>4</b>	50	1/2 (the symbol) of any even whole number up to 20
	<b>100</b>	
<b>5</b>	50	Half (the word) of any even whole number up to 50
<b>5</b>	50	1/2 (the symbol) of any even whole number up to 50
	<b>100</b>	
<b>6a</b>	30	Half (the word) of any even whole number up to 100
<b>6a</b>	30	1/2 (the symbol) of any even whole number up to 100
<b>6a</b>	40	Equivalent fractions involving 1/2. up to denom of 20 eg (2/4 = ?/2) (1/2 = ?/8)
	<b>100</b>	
<b>6b</b>	20	Equivalent fractions involving 1/5. up to denom of 50 eg (20/50 = ?/5) (4/5 = ?/20)
<b>6b</b>	60	Fractions of nums up to 45. Use 1/2, 1/3, 1/4, 1/5, numerator always 1. Whole number answer. eg 1/5 of 25
<b>6b</b>	20	Equivalent fractions involving 1/4 up to denom of 40
	<b>100</b>	
<b>7a</b>	40	Fractions of nums up to 30. Use 1/2s, 1/3s, 1/4s, 1/5s. NB Includes unit and non unit fractions ie 1/5 and 3/5 eg 3/5 of 25
<b>7a</b>	20	Equivalent fractions. Denom of 100. eg 75/100 = 3/?, 60/100 = ?/5
<b>7a</b>	20	Fractions times (x) nums up to 50. Use 1/2, 1/3s, 1/4s, 1/5s NB Includes unit and non unit fractions ie 1/5 and 3/5 eg 3/5 x 25
<b>7a</b>	20	Number times fraction up to 50. Use 1/2, 1/3s, 1/4s, 1/5s eg 25 x 3/5
	<b>100</b>	
<b>7b</b>	12	Quarters (word) numbers within the number facts range (to 10 times) exact answers
<b>7b</b>	13	1/4 s (symbol) of numbers within the number facts range (to 10 times). Exact answer.
<b>7b</b>	12	Thirds (word) of numbers within the number facts range (to 10 times). Exact answer
<b>7b</b>	13	1/3 s (symbol) of numbers within the number facts range (to 10 times). Exact answer
<b>7b</b>	12	Fifths (word) of numbers within the number facts range (to 10 times). Exact answer.
<b>7b</b>	13	1/5 s (symbol) of numbers within the number facts range (to 10 times). Exact answer.
<b>7b</b>	12	Tenths (word) of numbers within the number facts range (to 10 times). Exact answer.
<b>7b</b>	13	1/10 s (symbol) of numbers within the number facts range (to 10 times). Exact answer.
	<b>100</b>	

<b>8</b>	30	$1/6, 1/7, 1/8, 1/9$ of numbers to 100. Exact answer. eg $1/6 \times 42$
<b>8</b>	30	$1/6$ s, $1/7$ s, $1/8$ s, $1/9$ s of numbers to 100. Exact answer. eg $5/6 \times 36$
<b>8</b>	20	Divide whole numbers (1 to 10) by $1/2$
<b>8</b>	20	Divide whole numbers (1 to 10) by $1/3, 1/4, 1/5$
	<b>100</b>	

## Percentages

<b>6a</b>	100	Change $\frac{1}{2}$ , $\frac{1}{10}$ , $\frac{1}{4}$ , $\frac{3}{4}$ , $\frac{1}{5}$ to % eg $\frac{1}{4} = ?\%$
	<b>100</b>	
<b>6b</b>	80	Change $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{3}{4}$ , $\frac{1}{5}$ , $\frac{2}{5}$ , $\frac{3}{5}$ , $\frac{4}{5}$ and all tenths to % eg $\frac{3}{5} = ?\%$ , $\frac{3}{10} = ?\%$
<b>6b</b>	20	50% of even numbers to 50
	<b>100</b>	
<b>7a</b>	50	Change (0.1 - 0.9) to % eg $0.3 = ?\%$
<b>7a</b>	50	50% of even numbers to 100
	<b>100</b>	
<b>7b</b>	20	Change (0.01 - 0.09) to % eg $0.03 = ?\%$
<b>7b</b>	20	10% of multiples of 10 to 100
<b>7b</b>	20	25% of multiples of 4 to 100
<b>7b</b>	20	20% of multiples of 5 to 100
<b>7b</b>	20	33 $\frac{1}{3}\%$ of multiples of 3 to 100
	<b>100</b>	
<b>8</b>	50	Change (0.01 - 0.99) to % . (Note 0.20 should be displayed as 0.2) eg $0.03 = ?\%$
<b>8</b>	25	75% of multiples of 4 to 100
<b>8</b>	25	5% of multiples of 20 to 100
	<b>100</b>	
<b>9</b>	25	12 $\frac{1}{2}\%$ of multiples of 8 to 100
<b>9</b>	60	40%,60%,80% of multiples of 5 to 100
<b>9</b>	15	Change whole numbers (1-9) to percentage eg $2 = ?\%$
	<b>100</b>	



## Squares and Square Roots

6	50	17. Squares of all numbers from 1-10
6	50	$\sqrt{1} - \sqrt{100}$
	<b>100</b>	
7	50	21. Squares of all numbers 1 –12
7	50	$\sqrt{1} - \sqrt{144}$
	<b>100</b>	
8	37	Squares of all numbers 1- 20
8	13	23. Squares of ten multiples 0-100
8	50	$\sqrt{1} - \sqrt{400}$
	<b>100</b>	
9	25	squares of numbers 1- 31
9	25	22. Squares of tenths 0.1-0.9
9	12	$\sqrt{1} - \sqrt{400}$
9	38	$\sqrt{100} - \sqrt{961}$
	<b>100</b>	

## Powers

7	50	Squares and cubes of all numbers 1 - 5
7	50	Powers of 2 up to $2^5$ , ie $2^0 - 2^5$
	<b>100</b>	
8	34	Squares and cubes of all numbers 1 - 5
8	33	Powers of 2 up to $2^{10}$ , ie $2^0 - 2^{10}$
8	33	Powers $1^0 - 10^0$
	<b>100</b>	
9	17	Squares and cubes of all numbers 1 - 6
9	17	Powers of 2 up to $2^{10}$ , ie $2^0 - 2^{10}$
9	16	Powers $1^0 - 10^0$
9	25	Powers of 3 up to $3^5$ , ie $3^0 - 3^5$
9	25	Powers of 10 up to $10^6$
	<b>100</b>	
10	12	Squares and cubes of all numbers 1 - 6
10	12	Powers of 2 up to $2^{10}$ , ie $2^0 - 2^{10}$
10	12	Powers $1^0 - 10^0$
10	12	Powers of 3 up to $3^5$ , ie $3^0 - 3^5$
10	12	Powers of 10 up to $10^6$
10	20	Powers of 5 up to $5^4$
10	20	Powers $1^4 - 3^4$
	<b>100</b>	

## Mixed Tables

**3a** 100 2 times, 2x3 and 3x2  
**100**

**3b** 50 1 times  
**3b** 50 2 times  
**100**

**3c** 20 1 times  
**3c** 40 2 times  
**3c** 40 10 times  
**100**

**4a** 10 0 times  
**4a** 10 1 times  
**4a** 25 2 times  
**4a** 25 10 times  
**4a** 30 5 times  
**100**

**4b** 8 0 times  
**4b** 8 1 times  
**4b** 18 2 times  
**4b** 16 10 times  
**4b** 20 5 times  
**4b** 30 4 times  
**100**

<b>5a</b>	5	0 times
<b>5a</b>	5	1 times
<b>5a</b>	10	2 times
<b>5a</b>	10	10 times
<b>5a</b>	20	5 times
<b>5a</b>	20	4 times
<b>5a</b>	30	3 times
	<b>100</b>	

<b>5b</b>	3	0 times
<b>5b</b>	4	1 times
<b>5b</b>	7	2 times
<b>5b</b>	7	10 times
<b>5b</b>	13	5 times
<b>5b</b>	16	4 times
<b>5b</b>	20	3 times
<b>5b</b>	30	6 times
	<b>100</b>	

<b>6a</b>	3	0 times
<b>6a</b>	3	1 times
<b>6a</b>	6	2 times
<b>6a</b>	4	10 times
<b>6a</b>	7	5 times
<b>6a</b>	14	4 times
<b>6a</b>	15	3 times
<b>6a</b>	20	6 times
<b>6a</b>	28	8 times
	<b>100</b>	

6b	1	0 times
6b	1	1 times
6b	4	2 times
6b	4	10 times
6b	5	5 times
6b	5	4 times
6b	8	3 times
6b	12	6 times
6b	20	8 times
6b	20	7 times
6b	20	9 times
	<b>100</b>	

7	1	0 times
7	1	1 times
7	4	2 times
7	3	10 times
7	4	5 times
7	7	4 times
7	7	3 times
7	9	6 times
7	12	8 times
7	12	7 times
7	12	9 times
7	14	11 times
7	14	12 times
	<b>100</b>	

5a	5	0 times
5a	5	1 times
5a	10	2 times
5a	10	10 times
5a	20	5 times
5a	20	4 times
5a	30	3 times
	<b>100</b>	

5b	3	0 times
5b	4	1 times
5b	7	2 times
5b	7	10 times
5b	13	5 times
5b	16	4 times

6b	1	0 times
6b	1	1 times
6b	4	2 times
6b	4	10 times
6b	5	5 times
6b	5	4 times
6b	8	3 times
6b	12	6 times
6b	20	8 times

6b	20	7 times
6b	20	9 times
	<b>100</b>	

## Directed Numbers (Operations with Integers)

<b>7a</b>	35	$A + B$ where $A, B$ are integers in range $-10$ to $10$
<b>7a</b>	35	$A - B$ where $A$ is integer in range $-10$ to $10$ , $B$ is $1$ to $10$
<b>7a</b>	30	$A(B)$ $A$ is integer $1$ to $5$ , $B$ is $-5$ to $5$
	<b>100</b>	
<b>7b</b>	25	$A - B$ where $A$ is integer in range $-10$ to $10$ , $B$ is $-10$ to $10$
<b>7b</b>	50	$A(B)$ $A$ is integer $-5$ to $5$ , $B$ is $-10$ to $10$
<b>7b</b>	25	$A + B$ where $A, B$ are integers in range $-15$ to $15$
	<b>100</b>	
<b>8a</b>	30	$A/B$ (as fraction) where $A, B$ are integers, $B$ ( $-5$ to $5$ ) $A$ is $\pm$ multiple of $B$ up to $100$
<b>8a</b>	30	$A$ divided by $B$ where $A, B$ are integers, $B$ ( $-5$ to $5$ ) $A$ is $<100$ and $\pm$ multiple of $B$
<b>8a</b>	20	$A(B)$ $A$ is integer $-5$ to $5$ , $B$ is $-10$ to $10$
<b>8a</b>	20	$(A)(B)$ , where $A, B$ are integers in range $-6$ to $6$
	<b>100</b>	
<b>8b</b>	35	$A + B$ where $A, B$ are integers in range $-20$ to $20$
<b>8b</b>	35	$A - B$ where $A$ is integer in range $-20$ to $20$ , $B$ is $1$ to $20$
	<b>100</b>	
<b>9</b>	50	$A - B$ where $A$ is integer in range $-20$ to $20$ , $B$ is $-20$ to $20$
<b>9</b>	10	$A(B)$ $A$ is integer $-10$ to $10$ , $B$ is $-10$ to $10$
<b>9</b>	10	$(A)(B)$ , where $A, B$ are integers in range $-10$ to $10$
<b>9</b>	10	$A \times B$ where $A, B$ are integers in range $-10$ to $10$
<b>9</b>	10	$A/B$ (as fraction) where $A, B$ are integers, $B$ ( $-10$ to $10$ ) $A$ is $\pm$ multiple of $B$ up to $100$
<b>9</b>	10	$A$ divided by $B$ where $A, B$ are integers, $B$ ( $-10$ to $10$ ) $A$ is $\pm$ multiple of $B$ up to $100$
	<b>100</b>	
<b>10</b>	50	$A + B$ where $A, B$ are integers in range $-100$ to $100$
<b>10</b>	50	$A - B$ where $A$ is integer in range $-100$ to $100$ , $B$ is $-100$ to $100$
	<b>100</b>	

## REVISION MATRICES

### Addition

Total

	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6	7	8	9	10				
1a	100																		100
1b		100																	100
2a			100																100
2b				100															100
3a					100														100
3b						100													100
4a							100												100
4b							20	80											100
5a							10	20	70										100
5b							8	12	30	50									100
6							10	10	10	20	50								100
7							5	7	10	14	24	40							100
8							7	8	10	12	12	15	36						100
9							5	5	11	11	11	11	16	30					100
10							5	5	5	10	10	10	10	15	30				100

## Subtraction

Total

	1	2	3	4	5	6	7	8	9	10										
1	100																			100
2		100																		100
3		40	60																	100
4		20	25	55																100
5		10	20	20	50															100
6		5	15	15	25	40														100
7			5	15	15	25	40													100
8			5	5	15	15	20	40												100
9			5	5	10	10	10	20	40											100
10				5	5	10	10	10	20	40										100

## Squares and Square roots

Total

	6	7	8	9																	
6	100																				100
7		100																			100
8			100																		100
9				100																	100

## Powers

Total

	7	8	9	10																	
7	100																				100
8		100																			100
9			100																		100
10				100																	100



### Decimal +/-

Total

	6a	6b	7a	7b	8a	8b	9	10											
<b>6a</b>	100																		100
<b>6b</b>	40	60																	100
<b>7a</b>	15	35	50																100
<b>7b</b>	10	20	25	45															100
<b>8a</b>	10	15	18	24	33														100
<b>8b</b>	5	10	15	15	23	32													100
<b>9</b>	5	8	10	13	15	19	30												100
<b>10</b>	2	5	9	10	13	13	18	30											100

### Decimal x/÷

Total

	6a	6b	7a	7b	8a	8b	9	10											
<b>6a</b>	100																		100
<b>6b</b>	40	60																	100
<b>7a</b>	15	35	50																100
<b>7b</b>	10	20	25	45															100
<b>8a</b>	10	15	18	24	33														100
<b>8b</b>	5	10	15	15	23	32													100
<b>9</b>	5	8	10	13	15	19	30												100
<b>10</b>	2	5	9	10	13	13	18	30											100

## Tables

	3a	3b	3c	4a	4b	5a	5b	6a	6b	7									Total
3a	100																		100
3b		100																	100
3c			100																100
4a				100															100
4b					100														100
5a						100													100
5b							100												100
6a								100											100
6b									100										100
7										100									100

## Directed Numbers

	7a	7b	8a	8b	9	10													Total
7a	100																		100
7b	50	50																	100
8a	40	40	20																100
8b	30	25	20	25															100
9	18	20	16	20	26														100
10	13	15	12	15	25	20													100

## Multiplication Extension

Total

	3	4	5a	5b	5c	6a	6b	6c	7a	7b	8	9	10						
3	100																		100
4		100																	100
5a			100																100
5b				100															100
5c					100														100
6a						100													100
6b							100												100
6c								100											100
7a									100										100
7b										100									100
8											100								100
9												100							100
10													100						100

## Division Extension

Total

	4	5a	5b	5c	6a	6b	6c	7a	7b	8	9	10							
4	100																		100
5a		100																	100
5b			100																100
5c				100															100
6a					100														100
6b						100													100
6c							100												100
7a								100											100
7b									100										100
8										100									100
9											100								100
10												100							100

## Counting

Total

	1a	1b	2	3a	3b	3c	4a	4b	5a	5b	6	7a	7b	8	9			
1a	100																	100
1b		100																100
2			100															100
3a				100														100
3b					100													100
3c						100												100
4a							100											100
4b								100										100
5a								35	65									100
5b								20	40	40								100
6								4	8	8	80							100
7a								4	8	8	30	50						100
7b								3	6	7	10	24	50					100
8								2	4	5	9	15	35	30				100
9								2	3	4	6	7	8	10	60			100

## Fractions

Total

	4	5	6a	6b	7a	7b	8											
4	100																	100
5		100																100
6a			100															100
6b			20	80														100
7a			15	15	70													100
7b			5	10	15	70												100
8			5	10	15	30	40											100

# Percentages

Total

	6a	6b	7a	7b	8	9													
6a	100																		100
6b		100																	100
7a		50	50																100
7b		20	20	60															100
8		10	10	50	30														100
9		10	10	30	25	25													100