 **Teaching & Learning Plan**

**Plan: Addition, Subtraction, Multiplication and Division of Decimals  
Junior Certificate Syllabus  
Leaving Certificate Syllabus**

**Created by Teachers**

**Teaching & Learning Plan: Addition, Subtraction, Multiplication and division with decimals**

Aims

* To familiarise students with the operations of addition, subtraction, multiplication and division of decimals.
* To enable students to understand the “shortcuts” used through an understanding of basic concepts using the links between fractions and decimals.

Prior Knowledge

*Prior knowledge and experience of handling fractions and decimals is required.*

Students have prior knowledge of fraction concepts and operations with fractions. They should understand place value in a base 10 system and the link between fractions and decimals. Students should be able to modelling decimals using a 10x10 grid, hundredths disc and a metre stick.

Learning Outcomes

As a result of studying this topic, students will be able to

* add and subtract decimal numbers with understanding of the underlying concepts
* multiply and divide decimals

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**Teaching & Learning Plan: Addition, Subtraction, Multiplication and Division with Decimals**

**Relationship to Junior Certificate Syllabus**

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| **Topic** | **Description of topic**  *Students learn about* | **Learning outcomes**  *Students should be able to* |
| 3.1 Number systems | Problems set in context, using diagrams to solve the problems so they can appreciate how the mathematical concepts are related to real life. Algorithms used to solve problems involving fractional amounts. | * use the equivalence of fractions, decimals and percentages to compare proportions |

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**Teaching & Learning Plan: Addition, Subtraction, Multiplication and Division with Decimals**

**Relationship to Leaving Certificate Syllabus**

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| **Sub-Topic** | **Learning outcomes** | | |
| **Students learn about** | **Students working at FL should be able to** | **In addition students working at OL should be able to** | **In addition students working at HL should be able to** |
| 3.1 Number systems | Revisit the operations of addition, multiplication, subtraction and division in the following domains.  N of natural  numbers,  Z of integers,  Q of rational  Numbers,  R of real numbers and represent these numbers on a number line.   * develop decimals as special equivalent fractions strengthening the connection between these numbers and fraction and place value understanding |  |  |

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**Teaching & Learning Plan: Addition, Subtraction, Multiplication and Division with Decimals**

Resources Required

10 x 10 grid, Number line

**Introducing the Topic**

**Check with students what rules they may have used previously (examples below).**

Addition and Subtraction: Line up the decimal points and treat as whole numbers

Multiplication: Ignore the decimal point, multiply the numbers, count the number of decimal digits in the question, count in that number of places from the right in the answer and put the decimal point back in.

Division: Convert the number you are dividing by to a whole number by shifting the decimal point in the divisor to the right until you have a whole number, and shift the decimal point in the dividend to the right the same number of decimal places. If there is still a decimal point in the dividend (the number you are dividing into) put the decimal point in the answer in the same spot as in the dividend. **However........................**

This works, but it does not teach any mathematics. The student should first of all see the sense of these “rules” for example, by finding out that in the case of addition and subtraction you add tenths to tenths etc as in fraction addition where you add fractions with common denominators - this makes sense of lining up the decimal point).

2.3 x 0.2 has 2 decimal places in the answer because:

2.3 x 0.2 =

(An area model could also show this but the multiplication algorithm for fractions has been explained when doing fractions)



**Real Life Context**

The following examples could be used to explore real life contexts:

* “With President Bush cheering him on, Phelps dominated his first event of the Beijing Olympics on Sunday morning, crushing his own world record and all hopes of his challengers with a mark of 4 minutes, 3.84 seconds in the 400-meter individual medley”. See other sports records written as decimal numbers.
* “Watch your odometer – the turnoff will be about 1.8 miles from the hotel”.
* The total bill for a meal between you and your 2 friends is €37.84. How much does each of you pay?
* On holidays in the States you paid $12.23 for coffee and a sandwich. At home you would have paid €6.70. Were you being overcharged? ( Exchange Rate: €1=$1.37260)
* Lengths, areas, volumes in real life rarely have integer values

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| **Lesson Interaction** | | | |
| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| » The following problems are given as mental arithmetic. Students should try them without the aid of the 10 x 10 grids if possible | | | |
| * 0.23 + 2.07 * 0.80 – 0.16 * 0.91+0.14 | * 23 hundredths + 2 and 7 hundredths = 2 and 30 hundredths =2.30 * 80 hundredths – 16 hundredths=0.64 * 91 hundredths +14 hundredths = 1.05 | * Write the questions on the board and then ask individual students to explain how to add them and come up with an answer. | * Can students visualise the tenths strips (used in the lesson on decimals and place value) each containing 10 hundredths? |
| * **Estimate** : 0.46 +0.3 * Will the answer be > ½ or < ½ | * 0.46 is 46/100. 0.3 is 3/10 which is 30/100 (3 strips of 10 each) so therefore answer is > ½. | * If students are having difficulties show a 10x10 grid. | * Can students reason why the answer is not 0.49? |
| * Calculate mentally the exact answer without using a grid: 0.46+0.3 What are you being asked to add in terms of fractions? | * 46 hundredths + 3 tenths i.e. 4 tenths + 6 hundredths + 3 tenths * 7 tenths + 6 hundredths = 0.76 | * Use terms like tenths, hundredths etc rather than “point 46” to help understanding. |  |
| * Write down 0.46 +0.3 underneath each other and add. * Why is it not 0.49? | * 0.46   + 0.3  0.76   * That would be 49 hundredths and we are adding 46 hundredths and 30 hundredths, not 46 hundredths and 3 hundredths (0.03). | * Lead students to come up with the understanding that if you line up the decimal points then you are adding fractions with common denominators. | * Do students realise that you add tenths to tenths and hundredths and this is why you line up decimal points? Are students using the estimate step first always? |

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| KEY: » next step • student answer/response 5 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| * Estimate 0.65 -0.08   Will the answer be >0.5 or < 0.5?   * Explain how you get the answer without using a grid. | * 0.08 < 1/10  We are taking away less that 1/10 from 0.65.  0.65 -0.1 =0.55   Hence the answer> ½.   * 65 hundredths – 8 hundredths= * 65 hundredths – 10 hundredths + 2 hundredths = 55 hundredths + 2 hundredths = 57 hundredths = 0.57 | * Teacher asks students to verbalise the mathematics they are using and their reasoning. | * Can students explain why their estimation method works? * Can students come up with different strategies? |
| * 0.65 -0.08   Show how you might do this using the grids. | * Students show using two 10 x 10 grids that  0.65 -0.08 = 0.57   **(Appendix 1)** | * Circulate, and check that students are able to show why the answer is 0.57. | * Are students who have instrumental understanding of this able to explain the answer? |
| * Write down as decimals underneath each other | * 0.65 - 0.08 \_\_\_\_\_\_   0.57 |  | * Are students lining up the decimal points with understanding of why it is necessary? |
| * Estimate 0.834 -0.6  Is the answer <0.8 or >0.8? | * <0.8 as you’re taking 6/10 from more than 8/10 so answer is between 2 and 3 tenths. |  |  |

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| KEY: » next step • student answer/response 6 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| * 1.834-0.6   Give the problem in words. | * 1 unit, 8 tenths, 3 hundredths and 4 thousandths – 6 tenths =1 unit, 2 tenths 3 hundredths and 4 thousandths |  | * Can students see that “whole number thinking” taking 6 from 834 and getting 1.828 would be incorrect? |
| * Write down the decimals underneath each other and subtract. | * 1.834   - 0.6  \_\_\_\_\_  1.234 | * Check that students are aligning decimal points with understanding. | * Are estimates helping students to do the exact calculations correctly? |
| * Do **Student Activity 1** in pairs. * Each group will explain an answer to the class when finished. | * Students use grids if necessary otherwise they estimate first and then write the numbers underneath each other and add or subtract. | * Distribute Student Activity 1, 10 x10 grids and number lines and check work. Check that students are estimating first. | * Are students making sense of answers through estimation and noting the context as opposed to just combining numbers? Do they know when to subtract and when to add? |
| **Multiplication of numbers with decimals – using estimates and conversion to decimal fractions. First look at multiplying and dividing by powers of 10.** | | | |
| * Multiply 3.43 by 10   Estimate first.  Break down the number and explain the answer | * Estimate: 10 x 3 = 30  The answer is between 30 and 40.   10 x 0.4 = 10 x 4/10 = 40/10 = 4 units   * 10 x0.03 = 10 x 3/100 =30/100= 3/10=0.3 * Final answer = 34.3 |  |  |

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| KEY: » next step • student answer/response 7 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| * Multiply 3.43 by 100   Estimate first | * Estimate : 3 x100=300 * 100 x 0.4=100 x 4/10 = 40 * 100 x 0.03 = 100 x 3/100 = 3 units * Final answer = 343 | * Get students to decompose the number and combine the answers. |  |
| * What is 3.43 x1000   Estimate first | * Estimate: 3 x 1000 = 3000 * Answer is 3430 as each multiplication by 10 moves each number to the next place value – units to tens etc |  | * Are students thinking in terms of the size of the answer rather than trying to remember a rule about the decimal point moving right or left? |
| * What if 3.43 x 1000000   Estimate first   * Can you see the pattern in repeated multiplication by 10? | * 3 x 1000000 = 3000000 * Answer: 3430000 * With each multiplication by ten, 3.43 is 10 times bigger. We are multiplying by 10 six times. The decimal point moves 1 place to the right for each multiplication by 10. | * Ask different student to come up with a pattern /general rule for multiplication by 10. | * Are students able to justify their rules? |
| * Estimate first | * Estimate: * Answer 0.343 |  | * Are students using their understanding of place value to work out the answer to division by 10? |

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| KEY: » next step • student answer/response 8 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| Estimate first |  |  |  |
| Estimate first   * Can you see a pattern or general rule for division by 10? | * Each time you divide by 10 the decimal point moves one place to the left. | * Ask different student to come up with a pattern or general rule for division by 10. | * Are students estimating first and using the place value of numbers to find the estimate? |
| * Complete **Student activity 2** | * Students work in pairs on this activity. | * Distribute **Student Activity 2**. Circulate and check work. |  |
| * Multiply 4 by 36 | * Students may deconstruct the number into 4 x 30 + 4 x6 = 144 | * Write the question on the board and fill in the answer given by students. |  |
| * I need to fill 4 jugs with orange juice each holding 3.6 litres. How much orange juice is that altogether? Estimate first and explain estimate. * Do the exact calculation. * How could you have used the estimate to get the answer? | * The answer is between 12 and 16 litres as  4 x3 =12 and 4 x4 =16 and 3.6 is between 3 and 4 but closer to 4 so the answer will be closer to 16 than to 12. * 3.6+3.6+3.6+ 3.6 = 14.4 or * 4 x3 and add to 0.6 x 4.   Answer = 14.4 litres or   * Ignore the decimals and use the answer for 4 x 36 = 144 and then place the decimal point using the estimate i.e. between 12 and 16 – hence 14.4. | * Ask students for different ways of working this out without using a calculator. | * Can students use the following algorithm for multiplying numbers with decimals using estimates?   Estimate first to get an idea of the magnitude of the answer. Then, ignore the decimal points, do the calculation as if all the numbers were whole numbers. When finished place the decimal point using the estimation. |

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| KEY: » next step • student answer/response 9 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| * What do you notice about the last 2 questions? | * Same digits are used but the digits 3 and 6 have different place values in the 2 questions. The answers have the same digits also but again different place value. |  |  |
| * Can you explain how the second problem 4 x 3.6 is related to the first problem  4 x 36? | * 4 x 3.6 = 4 x 36 tenths = * 10 tenths is 1 unit, 40 tenths is 4 units, 100 tenths is 10 units. Answer is 14.4 | * If students say ask them to explain what   means – adding 4 lots of 36 tenths – so what type of parts do they end up with? | * Do students see that multiplying numbers by decimals converts to whole number multiplication when the decimals are converted to decimal fractions? |
| * Use your calculators to multiply 245 x 89,   2.45 x 8.9,  0.245 x 0.0089   * Make up questions of your own similar to these. | * 245 x 89=21805 * 245 x 8.9 = 2180.5 * 0.245 x 0.0089 = 0.0021805 | * Check that students are estimating first and comparing calculated answer with the estimate. |  |
| * What do you notice about the questions and the answers? | * The questions use the same digits in the same order for each question, but with a different number of decimal digits and the answers all have the same digits in the same order but with a different number of decimal digits. |  | * Do students see that the digits in the product depend on the digits of the two numbers multiplied and remain the same even if the number of decimal places is changed in the original two numbers? |

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| KEY: » next step • student answer/response 10 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| * Multiply 25 by 63 * Do this without your calculators | * 5 lots of 63 +20 lots of 63 = 5 lots of 60 + 5 lots of 3 + 20 lots of 60 +20 lots of 3 * Or 10 lots of 25 by 6 + 3 lots of 25  or  6 lots of 25( 4 lots + 2 lots) by 10 +3 lots of 25 * Answer = 1575 | * Encourage students to do this mentally and ask different students to explain their strategies. * Students may also use the algorithm they learned in primary school. |  |
| * Now use the above answer to calculate 0.25 x 6.3, so that you can use the whole numbers 25 and 63.   Estimate the answer first. | * Estimate: 0.25 is ¼, ¼ of 6.3 >1 and ¼ of 8=2.   Answer is between 1 and 2   * 25 x 63 = 1575. Using the estimate 0.25 x 6.3 = 1.575   **or**   * , 6.3 = * Hence 0.25 x 6.3 =   1.575 units (fits with the estimate) | * Show the 10 x 10 grids if necessary. |  |

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| KEY: » next step • student answer/response 11 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| * Now calculate 25 x 0.63 using the answer to 25 x 63. * Estimate first. | * Estimate: 0.63 (63 hundredths) is > ½ and <1. 25 x ½ = 12 ½. 25 x 1 = 25 * Therefore the answer is between 12 and 25 but closer to 12 because 0.63 is closer to 0.5 than to 1. * 25 x 63 = 1575. Using the estimate 25 x0.63 = 15.75   or 25 x 0.63 = 25 x= |  |  |
| * Do you notice anything about the number of decimal digits in the question and in the answer in the last two questions? | * The number of decimal digits in the question is the same as the number of decimal digits in the answer i.e. 3 and 2 respectively |  | * Can students come up with the pattern themselves and if they forget the rule/shortcut will they be able to use the estimate to decide on the answer? |
| * Multiply 0.25 x0.63 using the result from 25 x 63   Explain your answer.  Check your answer using a calculator. | * 0.1575 * Same digits in the answer as when multiplying 25 x 63 and from the pattern noticed before as there are 4 decimal places in the question there are 4 decimal places in the answer. |  | * Are students able to give the answer straight away using the algorithm? |

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| KEY: » next step • student answer/response 12 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| * Explain the answer for 0.25 x 0.63 using estimation. | * Estimate:  Close to ¼ x 60/100 =  15/100 = 0.15 * 25 x 63 = 1575 * Using the estimate  0.25 x 0.63 = .1575 or   0.25 x 0.63 =  =0.1575 | * Tell students that for very large and very small numbers they will write them as numbers between 1 and 10 multiplied by the appropriate power of 10 which is scientific notation and hence they will still be able to use estimation. * Distribute **Student Activity 3** |  |
| **Division of numbers with decimals** | |  |  |
| * Do the following calculations on your calculators.          * What do you notice? | * 6.2 * 62 * 62000 * All the quotients have the same digits with extra zeros to indicate greater place value. |  |  |

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| KEY: » next step • student answer/response 13 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| * Justify why =6.2 * Estimate first. * Do the exact division using whole numbers only and let the estimate help you decide where to put the decimal point. | * 0.4 is close to 0.5 = ½ and 2.48 is close to 2 ½. There are 5 halves in 2 ½. Since 0.4 is smaller than ½ we would expect the answer to be bigger than 5. * and using our estimate the answer to |  |  |
| * You already know how to divide by whole numbers. Adjust the question without changing the answer so that you are dividing by a whole number. | * (fits with estimate) or | * Remind students of how they formed equivalent fractions. | * Are students able to relate this back to their strategy for forming equivalent fractions? |
| * Apply this method to |  |  | * Can students see that this is the same as moving the decimal point 3 places to the right in the divisor and dividend but that this process makes sense of moving the decimal point? |

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| KEY: » next step • student answer/response 14 |

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| **Student Learning Tasks:**  **Teacher Input** | **Student Activities: Possible and Expected Responses** | **Teacher’s Support and Actions** | **Checking Understanding** |
| * Summarise what you have learned about how to divide numbers with decimals. | * Multiply the divisor and dividend by the same power of 10 to make the divisor a whole number. This gives the same result as moving the decimal point in the divisor to the right until the divisor is a whole number and moving the decimal point the same number of places to the right in the dividend. |  |  |
| * It is 207.36 km from Sligo to Dublin. It took Sarah 3.2 hours to complete the journey. What was average number of miles travelled per hour? Estimate first. | * Estimate: It took more than 3 hours so we expect the average speed to be less than 70 km per hr. | * Students need to think of the sharing model of division in this rate problem. We are “sharing” 207.36 miles between 3.2 hours. |  |
| * How could you do this problem based on making the divisor a whole number? | * We then do this problem by long division * Answer = 64.8 km per hour | * Distribute Student Activity 4 |  |

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| KEY: » next step • student answer/response 15 |

Appendix 1

0.65 – 0.08 =0.57

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1. Which is larger: 0.8 or 0.78? \_\_\_\_\_\_\_  
   Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which is larger 2.65 or 2.605? \_\_\_\_\_\_\_\_\_\_\_\_

Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. John ran a quarter mile race in 74.5 seconds. Mark said that he ran the same race in 82.34 seconds. How many seconds faster was John than Mark?

Estimate: \_\_\_\_\_\_

Explain the estimate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Exact calculation:

4. Flower seeds were planted in the school lab in March. By the end of April they were   
3.97 **mm** tall. By the end of May they were 6.483 **cm** tall. How much had they grown?

Estimate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Exact calculation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If they grew the same amount in June as they did in April how tall would they be at the end of June?

Estimate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Exact calculation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Estimate the value of 73.46 + 6.2 + 0.583 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain your estimation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Calculate the exact value of 73.46 + 6.2 + 0.583 (do not use a calculator).

Explain how you add and subtract any two decimal units.

Start at 32.47 and work down multiplying by 10 each time.

Arrange the numbers in the answer to the left and right of the decimal point depending on the answer.

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|  |  |  |  |  |  |  |  | **Tens of millions** | **millions** | **Hundreds of thousands** | **Tens of thousands** | **thousands** | **hundreds** | **tens** | ***units*** | **Decimal point** | **tenths** | **hundredths** | **thousandths** | **Ten thousandths** | **Hundred thousandthss** | **millionths** | **Tenth of millionths** | **Hundredths of millionths** |
| 3 | 2 | . | 4 | 7 |  | 1000000 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 |  | 100000 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 |  | 10000 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 |  | 1000 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 |  | 100 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 |  | 10 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| **3** | **2** | **.** | **4** | **7** | x | **1** | **=** |  |  |  |  |  |  | **3** | **2** | **.** | **4** | **7** |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 | x | 10 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 | x | 100 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 | x | 1000 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 | x | 10000 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 | x | 100000 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |
| 3 | 2 | . | 4 | 7 | x | 1000000 | = |  |  |  |  |  |  |  |  | **.** |  |  |  |  |  |  |  |  |

Moving to the right of the decimal point, what is happening to the place value of each number? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Moving to the left of the decimal point what is happening to the place value of each number? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Student Activity 3 – On multiplication of numbers with decimals**

1. Find 2 numbers whose product is 1568.

List other pairs of numbers whose product is 1568. Write down as many as you can think of.

What do you call two numbers which when multiplied together give you 1568? \_\_\_\_\_\_\_\_\_\_\_\_\_of 1568.

Using the answer to question 1, explain your answers to questions 2, 3, 4 and why you think they are correct.

1. Find 2 numbers whose product is 156.8

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation:

1. Find 2 numbers whose product is 1.568 (how else could you write 1.568?)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation:

1. Find 2 numbers whose product is 0.01568

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation:

1. Matthew received a fax giving him the dimensions of the rectangular living room in his new apartment.   
   The dimensions given were 3.76m x 5.49m.   
   He used his calculator to work out the area and got 2.06 m2. Do you think this answer is correct?

Explain.

Carpet is available in 4m and 3m width rolls. Both rolls cost the same amount per m2.   
Which width roll should Matthew purchase to minimise cost?

**Add, subtract, multiply and divide decimal numbers**

You decide to spend Saturday night with a couple of friends, have a pizza and go to see a film. You want to estimate how much it will cost and how many hours you would need to work at your part time job to fund it.

1. You will probably go to Planet Pizza as usual and order 3 medium pizzas, one with cheese, one with pepperoni and mushrooms, and one with ham and pineapple. A medium cheese pizza costs €12.75 and the toppings are €1.25 each. You will buy 3 drinks at €2.50 each and maybe leave a €3 tip. Estimate the cost of the bill. Calculate the exact cost and split it three ways to find what each person will owe.
2. A cinema ticket costs €8.75 and you can buy a box of popcorn for €3.40 and a drink for €1.75. How much will this cost for each person. Estimate first.
3. After the film you will probably spend €3 to rent a video game and €2.75 each on ice cream.
4. The ATM at the bank only dispenses €20 notes. How much will you need to withdraw to cover the cost of the evening?
5. Your part time job pays €7.65 per hour. How many hours will you need to work to fund the night out you are planning.