## Holyrood Mathematics Department



# Second Level Numeracy Coursework

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•	MyMaths - Craig Barton -	<u>www.mymaths.co.uk</u> <u>http://www.mrbartonmaths.com/index.html</u> https://variationtheory.com/
• • •	Whiterose Maths- Teejay Publishers - Dr Frost Maths- UKMT-	www.whiterosemaths.com https://teejaymaths.com/home/ https://www.drfrostmaths.com/ https://www.drfrostmaths.com/browse.php?mode=ukmt
•	Corbettmaths-	<u>https://www.ukmt.org.uk/</u> <u>https://corbettmaths.com/</u>

We are extremely thankful for allowing the use of your materials.

Best wishes,

Holyrood Mathematics and Numeracy department

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- 11. Links between digits and place value of decimals with fractions
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- 25. Distance, speed and time
- 26.Perimeter
- 27.Area
- 28.Volume
- 29.Unit conversions
- 30. Reading conversions Scales and decimal scales
- 31. Rounding

Second	Level	Numeracy	Course
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#### Lesson 1: Place value - Reading and Writing Numbers

#### LI:

- To be able to read, write and order whole numbers to 1 000 000, starting from any number in the sequence.
- To explain the link between a digit, its place and its value for whole numbers

Smartboard lesson: <u>https://app.mymaths.co.uk/42-lesson/ordering-whole-numbers</u>

https://app.mymaths.co.uk/43-lesson/place-value-hundreds-thousands

\*You will need Dienes materials/place value counters for this lesson

<u>Question 1:</u> The numbers in the ladder have been placed incorrectly; rewrite the numbers from biggest at the top to smallest at the bottom.





#### Question 2:

Redraw each bottle on the wall so that it is in the correct order from smallest to biggest



#### Question 3:

Rewrite these numbers from largest to smallest

3306 3932 3322 4753 4602	1507 4398 1894 1535 3364
1097 1043 2633 3269 1781	3242 2793 2717 4830 2987

#### Question 4:

Write forty five thousand, three hundred and seven using digits.

#### Question 5:

What is 34,251 in words?

Question 6:

Write the smallest six digit number from 605784, 605918 and 605179 in words.

#### Question 7: [Junior Kangaroo 2019 Q1]

Riana has been asked to erase digits from the number 12 323 314 to obtain a number which reads the same from left to right as it does from right to left. What is the smallest number of digits Riana needs to erase?

Second Level Numeracy	MNU: 2-02a				
<u>Lesson 2- Place value: [</u>	MNU: 2-03a				
<ul> <li>LI:</li> <li>To be able to read, write and order whole numbers to 1000000, starting from any number in the sequence.</li> <li>To explain the link between a digit, its place and its value for whole numbers</li> </ul>					
Smartboard lesson: <u>https:/</u>	/app.mymaths.co.uk/17	42-lesson/place-value-beyond-:	<u>10000</u>		
*You will need Dienes material	s/place value counters	for this lesson			
Question 1:					
What number is?					
a) 10 more than 8875       g) 10 more than 5744         b) 10 less than 1080       h) 10 less than 6714         c) 100 more than 5447       i) 100 more than 4151         d) 100 less than 7232       j) 100 less than 5533         e) 1000 more than 6655       k) 1000 more than 5786         f) 1000 less than 3095       l) 1000 less than 2528					
Question 2: Variation					
Number	Place value of 7	Number	Place value of 6		
<ul> <li>a) 4,567,912</li> <li>b) 112,746</li> <li>c) 7,345,631</li> <li>d) 8,764,522</li> <li>e) 5,976,999</li> <li>f) 6,117,531</li> </ul>		<ul> <li>g) 4,567,912</li> <li>h) 112,746</li> <li>i) 7,345,631</li> <li>j) 8,764,522</li> <li>k) 5,976,999</li> <li>l) 6,117,531</li> </ul>			
Question 3:		< Means	less than		
Place a > or < sign between each pair of numbers > Means			greater than		
a) 455,621 b) 15,012 c) 216,258 d) 123,456 e) 5,025	432,674 10,512 216,528 132,456 5,205	i) 512 j) 1,458 k) 21,158 l) 32,457 m) 408 152	521 1,548 21,185 32,547 408 125		
f) 1,025,852	1,250,528	n) 785,156	758,165		
g) 5,475,874	5,478,574	o) 741,128	471,128		
n) 4,128,48/ 📖	4,281,847	p) 2,345,654	2,434,654		

#### Lesson 3: Addition and Subtraction

MNU: 2-03a

LI:

• To be able to add and subtract whole numbers within the number range 0 to 1 000 000.

Smartboard lesson: <u>https://app.mymaths.co.uk/5789-lesson/mental-addition-and-subtraction</u>

https://app.mymaths.co.uk/14-lesson/add-2-digit-numbers

#### Question 1:

A train with 163 passengers stops at a station. At the station 38 people get on the train. How many are there now on the train?

How could you write this in 4 different ways?



#### Question 2:

The garage charged Mr Grant £199 for parts and £104 for labour. How much was Mr Grant's total garage bill?



#### Question 3:

Alex earned £1560 per month and Drew earned £983.

- (i) How much did they earn altogether?
- (ii) How much more did Alex earn than Drew?





MNU: 2-02a

#### Lesson 4: Continuation of Addition and Subtraction

MNU: 2-03a

#### LI:

- To be able to add and subtract whole numbers with more than 4 digits
- To be able to use written methods to solve addition and subtraction problems

Smartboard lesson: <u>https://app.mymaths.co.uk/4777-lesson/more-addition-and-subtraction</u>

https://mathsbot.com/manipulatives/placeValueCounters

\*You will need Dienes materials/place value counters for this lesson

#### Question 1:

Jake walked 2,168 m and then got a bus for another 42,258 m. How far did he travel altogether?

Give 4 ways of writing this sum



#### Question 2:

A judge fines a man £12,550 for breach of the peace plus £1950 damages. How much in total did the man have to pay?

£

9

Question 3: Fill in the blanks:

92,244 + 200 =	32,318 + 5,600 =
60,333 + 67 =	57,433 + 867 =
54,776 + 19 =	29,200 + 216 =

Second Leve	el Numeracy Course				
	22,737 - 600 =	53,595 - 1,000 =			
	70,500 - 44 =	42,900 - 536 =			
	74,356 - 502 =	77,281 - 7,036 =			
Question 4:	Problem Colving				
A supermarket sells three types of juice. Use the following clues to find the <b>total number of bottles</b> <b>of juice</b> the supermarket sells in a week: • The supermarket sells 846 more bottles of orange juice than apple juice. • It sells 118 more bottles of apple juice than peach juice. • It sells 656 bottles of apple juice.					
Question 5: The numbers	4751, 2188 and ${\mathcal X}$ add up to 113	316. What is the missing value of $\chi_{?}$			
Question 6: Using all digi <sup>.</sup>	ts from 1 to 6 in the following su	um try to make the number 579:			
	+	+	= 579		
			10		

#### Question 7:

The tallest building in the world is Burj Khalifa is 828m high. The second tallest building is the Toyko

Skytree at 534m. What is the <u>difference</u> in height between the two buildings?

#### Question 8:

Jenny calculated that 1479 - 134 was equal to 139. Identify the error that Jenny made and calculate the correct answer.

#### Question 9: [JMC 2012 Q11]

In the following expression, each  $\square$  is to be replaced with either + or – in such a way that the result of the calculation is 100.

### 123 🗆 45 🗆 67 🗆 89

#### Lesson 5: Factors and Multiples

#### LI:

• To identify multiples and factors of whole numbers and apply knowledge and understanding of these when solving relevant problems in number, money and measurement.

Smart board lesson: <u>https://app.mymaths.co.uk/45-lesson/multiples</u>

https://app.mymaths.co.uk/46-lesson/factors-and-primes

\*You will need Dienes materials/place value counters for this lesson

Question 1: Complete the number square for times tables up to 10

х	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

**Question 2:** Write down the first 10 multiples of the following:



Second Level Numeracy Course						
Question 3: Write down the :						
a) two factors of 11	b) four factors of 14	c) four factors of 10				
d) five factors of 16	e) six factors of 18	f) eight factors of 30				
Question 4: Complete the following	true/ false questions about factors:					
a) 4 is a factor of 32	b) 6 is a factor of 38	c) 7 is a factor of 56				
d) 8 is a factor of 72	e) 9 is a factor of 45	f) 5 is a factor of 135				
Question 5: Complete the following	true/ false questions about multiples:					
a) 27 is a multiple of 3	b) 42 is a multiple of 6	c) 54 is a multiple of 7				
d) 105 is a multiple of 5	e) 9 is a multiple of 45	f) 121 is a multiple of 11				
Question 6: Sam says that 1 is a	multiple of every number. Is Sam a	correct? Explain your answer.				
Question 7: Keith thinks of a nur of 3. Find three numbers which f	nber. The number is a multiple of 5 it this description.	5 but is three less than a multiple				

#### Question 8:

Haley wants to make a mosaic in the garden using slabs. She has 60 slabs and will arrange them in a rectangular array. List the different ways she can make a rectangle with 60 slabs.

<u>Question 9:</u> Suzy's age is 4 less than a number that is a multiple of both 6 and 9. If Suzy is younger than 30 years old, what is her age?

**Question 10:** Ahmed uses the calculation 200 ÷ 7 to find the highest multiple of 7 that is less than 200. What is his answer?

#### Question 11: Intelligent Practice of Factors

Factor Statement	True or False
6 is a factor of 3	
3 is a factor of 6	
3 is a factor of 9	
6 is a factor of 9	
3 is a factor of 18	
6 is a factor of 19	
9 is a factor of 18	
18 is a factor of 9	
9 is a factor of 9	
6 is a factor of 6	

Second Level Nur	MNU: 2-02a				
Lesson 6: Multiplic	MNU: 2-03a				
<ul> <li>LI:</li> <li>Uses multiplication facts to the 10th multiplication table.</li> <li>Multiplies whole numbers by two digit numbers</li> </ul>					
Smart board lesson: <u>https://app.mymaths.co.uk/127-lesson?hasFlash=true</u>					
	https://app.mymaths.co.uk/5782-lesson/mental-multiplication				
*You will need Dienes	materials/place value counters for this lesson				
Question 1: Using the	e grid method for single digits. Multiply the following:				
a) Paula pays £2	29 each month for her mobile phone. How much will she have pai	d after 6 months? £			
b) Jenny paid £1	7 each week to reduce her catalogue account? How much had sl	ne paid after 9 weeks? £			
c) If there are s	sixty seconds in one minute, how many seconds are there in 7 mi	nutes? s			
d) Chaz has fille Chaz have?	d 6 photograph albums. Each album contains 235 photographs. ⊢	low many photographs does			
Question 2: By bi	reaking the following numbers into their factor pairs find the fo	ollowing:			
a) There are 35	rows of 24 chairs. How many chairs altogether?				
b) There are 25	minibuses and 12 children are on each for a school trip. How ma	ny are there altogether?			
c) A pizza costs	£12. How much is 26 pizzas?	£			
d) A coat costs f	245. How much is 28 coats?	£			
<b>Question 3:</b> [JMC 2006 Q19] Pinocchio's nose is 5cm long. Each time he tells a lie his nose doubles in length. After he has told nine lies, his nose will be roughly the same length as a:					

- A Domino
- A tennis racquet
- A snooker table
- o Tennis court
- Football pitch

<u>Working</u>

#### Question 4:

Jenny has 14 packs of cakes. Each packet contains 8 individual cakes. Using the grid method, calculate how many cakes Jenny has in total.

#### Question 5:

Colin says multiplying a 2 digit number by a 1 digit number will always give a 2 digit answer. Is colin correct? Explain your answer.

#### Question 6:

Alice calculated 34 x 3 to be 912. Identify where Alice went wrong and calculate the correct answer.

#### Question 7:

Katie is paid £1,764 every month. How much does she earn in one year?

Question 8: Select the symbol that completes this number statement:

1,400 ÷ 20 = 1,400 ÷ 10 \_\_\_\_ 2

Second Level Numeracy Course	MNU: 2-020
Lesson 7: Long Multiplication using the Grid Method	MNU 2-020
<ul> <li>LI:</li> <li>Uses multiplication facts to the 10th multiplication table.</li> <li>Multiplies whole numbers by two digit numbers</li> </ul>	WIND: 2-030
Smart board lesson: <u>https://app.mymaths.co.uk/134-lesson/multiply-double-digits</u>	
*You will need Dienes materials/place value counters for this lesson	
Question 1: Use the grid method for long multiplication for the following:	
a) A ticket for a football game costs £68? How much 30 would tickets cost?	£
b) A speed boat travels at 70 km/h. How far would it travel in 32 hours?	km
c) The area of a room is 55 $m^2$ . What would the total area be for 40 rooms?	m <sup>2</sup>
d) A ferry takes 50 hours to complete its journey. How many hours would it take to	o complete 32 journeys?
Question 2: Use the grid method for long multiplication for the following:	
a) A smart phone costs £145? How much 20 phones cost?	£
b) A jet travels at 990 km/h. How far would it travel in 75 hours?	km
c) Crates hold 310 leather bags. How many bags will there be in 68 crates?	
d) Concrete blocks weigh 950 kg to complete its journey. What is the weight of 48	blocks? Kg
or 2 pirates each have 14 pieces of gold. How many pieces of gold do they have in total?	

#### Question 4

Charlie is using the grid method to calculate 300 × 20. Do you think the grid method is a good choice for this calculation? Explain your answer.

#### Question 5:

Happy Days Academy are trying to raise  $\pounds$ 2,000 for charity. The Academy organise a fashion show and sell 85 tickets for  $\pounds$ 17.00 each. How much more money do they still need to raise to meet their target?

#### Question 6:

Explain how Louis can use the calculation 4,293 × 6 = 51,516 to find the answer to 4,293 × 18.

#### Question 7: [JMC 2018 Q7]

What is the difference between  $20 \times 18$  and 20 + 18

Second Level Numeracy Course	MNU: 2-03b				
Lesson 8: Multiplying and Dividing by 10,100 and 1000					
<ul> <li>LI:</li> <li>To be able to multiply and divide whole numbers and decimal fractions to two decimal places by 10, 100 and 1000 and multiples of 10,100 and 1000.</li> </ul>					
Lesson and resources: <u>https://app.mymaths.co.uk/130-lesson/multiplying-by-10-and-100</u> <u>https://app.mymaths.co.uk/1423-lesson/dividing-by-10-and-100</u>					
Question 1: Some practice					
a) 85 x 10 b) 584 x 100 c) 125 x1000					
d) 70 ÷ 10 e) 700 ÷ 100 f) 54000 ÷ 1000					

#### Question 2:

Intelligent practice: Place in the first box either a x or  $\div$  and in the second box place a 10, 100 or 1000 to make the equation work



#### Question 3:

Molly has collected 475 stickers, and she buys 25 new stickers every week. In ten weeks, how many stickers will Molly have in total?

#### Question 4:

George runs 17,000 metres (m) in a week. How far does George run in kilometres?

#### Question 5:

What is the missing number from the calculation?

× 100 = 63,100

#### Question 6:

Use the calculation  $67 \times 54 = 3,618$  to find the answer to  $670 \times 540$ .

#### Question 7:

Light bulbs are sold in packs of 5 and there are 20 packs in each box. How many light bulbs are there in 250 boxes?

<u>Extra P</u>		
a)	50 x 20       b) 312 x 300       c) 141 x 4000	
d)	<b>e)</b> 63600 ÷ 30 <b>f)</b> 48400 ÷ 2000	2

Lesson 9: Dividing by a Single Digit

#### LI:

• To be able to divide whole numbers by a single digit, including answers expressed as decimal fractions, for example, 43 ÷ 5 = 8 · 6.

Lesson and resources: <u>https://app.mymaths.co.uk/1715-lesson/short-division</u>

https://mathsbot.com/manipulatives/placeValueCounters

https://mathsbot.com/manipulatives/coins

https://mathsbot.com/manipulatives/bar

\*You will need Dienes materials/place value counters for this lesson

#### Question 1:

My friend won money on a scratch card and managed to win  $\pm 27$ . He shares it between himself and 2 others. How much does each person get?



- Question 2: 78 cakes are shared between 6 friends. How many cakes do they each get? What if there are only 3 friends?
- Question 3: A farmer has 96 sheep. He has a total of 3 fields, all of which has to have an equal amount of sheep. How many sheep will be in each one?

If the number of fields changes to 4, how many sheep will be in each field?

If the number changes to 8, how many will now be in each field?

If the number of sheep increases to 328, how many sheep will be in each field?

#### Question 4:

- a) A bar of chocolate has 9 squares. How many are there if there are 621 squares?
- a) A jar contains 8 lollies, how many jars are needed for 2856 lollies?

Question 5:

What is 1,816 shared equally by 7? Use an r to show a remainder. For example, 10 remainder 2 is given as 10 r 2.

#### Question 6:

What is the missing number in the following calculation?  $3,440 \div 8 =$ \_\_\_\_ × 2

#### Question 7:

Frankie says, "Before working out the calculation 1,876 ÷ 5, I know that there will be a remainder in the answer." Explain how Franky can know this without doing any calculations.

#### Question 8:

Ellen swims for two hours every day, and she completes 7,350 metres (m) in a week. How many metres does she swim each hour?

 Extra practice

 a) 96 ÷ 6
 b) 594 ÷ 2
 c) 477 ÷ 3
 d) 783 ÷ 9

 e) 756 ÷ 7
 f) 5745 ÷ 5
 g) 8952 ÷ 4
 h) 6741 ÷ 3



Question 3: Place a > or < sign between the following:

>Means greater than

<Means less than

5.15	5.16
4.156	4.153
8.632	8.671
3.094	3.007
6.165	6.55

Question 4: Order the decimals on the line from largest to smallest:



Question 5: Order the following sets of numbers:



#### Question 6:

Amira is trying to find the number halfway between 2.5 and 3.7. Explain how she can do this and find the correct answer for her.

Question 7: Chen is thinking of two numbers.

- The numbers have a difference of 3.487.
- One of the numbers is 11.665 and the other number is less than 10.
- What is Chen's other number?

#### Question 8:

Which of these values is closest to 1.9: 1.99, 1.901, 1.88, 1.809, 1.8

#### Question 9:

Robert says that 12.753 is bigger than 12.87 because 753 is bigger than 87. Do you agree? Explain.

#### Lesson 11: Links between Digits, Place and Value of Decimals

#### MNU: 2-02a

#### MNU: 2-03a

#### LI:

- To be able to read, write and order sets of decimal fractions to three decimal places.
- To explain the link between a digit, its place and its value for numbers to three decimal places

Smartboard lesson: <u>https://app.mymaths.co.uk/1711-lesson?hasFlash=true</u>

**Question 1:** Show the following decimal numbers on the grids provided by shading the correct number of boxes.

Remember that 1 square represents a one hundredth. Ten squares will represent 1 tenth.

0.5

0.75

Question 2: Write down the value of each diagram



0.05

(

0.57



#### Lesson 12: Partitioning Decimals with Adding and Subtracting

#### MNU: 2-02a

#### LI:

- To be able to partition decimals up to three decimal places •
- To write decimals in terms of tenths, hundredths and thousandths
- To understand money written as a decimal

https://app.mymaths.co.uk/58-lesson/add-and-subtract-decimals Smartboard lesson:

https://mathsbot.com/manipulatives/placeValueCounters

#### Question 1:

An empty cooking pot weighs 0.6 kilograms. 3.7 kilograms of meat are placed in the pot.

What is the combined weight?

Show this in 4 different ways



#### Question 2:

It is 6.9 miles along the motorway from my house to the supermarket.

If I go the scenic route, it is 9.5 miles to the supermarket.

How much shorter is it to travel on the motorway?

#### Question 3:

One Monday in May, 12.15 mm of rain fell in the Scottish Highlands.

On the same day, 0.9 mm of rain fell in Pisa, Italy.

How much less rain fell in Pisa on that day?

Show this in 4 ways

#### Question 4:

A delivery man is pushing two parcels on a trolley.

One weighs 5.27 kg, the other weighs 6.5 kg.

What is the total weight of the parcels?



#### Question 5: Variation

a) 3.56 - 0.35 =	b). 3.56 -0.36=	c) 3.56 - 0.37=
d) 3.56 - 0.47=	e). 3.56 - 0.57=	f) 3.56 - 0.057=
g) 3.56 - 0.507=	h) 3.56 - 0.35 =	j) 3.55 - 0.35 =
j) 3.54 - 0.35=	k) 3.44 -0.35=	l) 3.34 - 0.35=
m) 33.4 - 0.35=	n) 0.224 - 0.35=	

#### Question 6: [IMC 2015 Q1]

What is the value of 1 - 0.2 + 0.03 - 0.004?

Working:

Second Level Numeracy Course	MNU: 2-03b						
Lesson 13: Multiplying and Dividing Decimals by 10,100 and 1000							
LI:							
• To be able to multiply and divide decimalsup to two de	ecimal places by 10,100 and 1000						
Smartboard lesson: <u>https://app.mymaths.co.uk/60-lesson/mu</u>	Itiply-decimals-by-10-and-100						
*Place value counters or money may be useful for this lesson							
https://mathsbot.com/manipulatives/coins							
https://mathsbot.com/manipulatives/placeValueCounters							
Question 1							
a) £47 is shared amongst 10 people. How much should each pers	son get? £						
b) Jo is saving for a bike and plans to save £10.50 each week. H	low much will he have in 10 weeks? £						
c) S2 pupils are trying to raise £660 for Mary's Meals. If there each pupil have to raise?	c) S2 pupils are trying to raise £660 for Mary's Meals. If there are 100 pupils, how much will £						
Question 2: Variation - Complete the following							
$15 \times 10 = $	51 x 100 =						
51 x 10 =	$15 \times 100 = $						
150 x 10 =	$501 \times 100 = $						
$5100 \ge 10 = $	5010 x 100 =						
0.051 x 10 =	$0.0501 \ge 100 =$						
$0.51 \ge 10 = $	0.501 x 100 =						
5.1 x 10 =	$5.01 \ge 100 = $						
56 ÷ 10 =	1265 ÷ 100 =						
$65 \div 10 = $	5612 ÷ 100 =						
5665 ÷ 10 =	5126 ÷ 100 =						
$1111 \div 10 = $	5261 ÷ 100 =						
6776 ÷ 10 =	526.1 ÷ 100 =						
677.6 ÷ 10 =	52.61 ÷ 100 =						
67.76 ÷ 10 =	5.261 ÷ 100 =						

#### Question 3:

Answer the questions below using your place value grid if you need to. Find the answer in the codebreaking table below and write the correct letter in the box to decipher an interesting fact about measures.

Be warned: there are some red herrings hidden here!

<b>A</b> = 448 ÷ 10	<b>B</b> = 0.000315 × 10	<b>C</b> = 23.52 ÷ 100	<b>E</b> = 3.38 ÷ 100	<b>G</b> = 44.8 ÷ 100
<b>H</b> = 315 × 100	<b>I</b> = 23.52 ÷ 10	<b>L =</b> 3.38 ÷ 10000	<b>M</b> = 4.48 × 1000	<b>N</b> = 0.315 × 1000
<b>O</b> = 23.52 × 10	<b>P</b> = 338 ÷ 100	<b>R</b> = 4.48 × 100	<b>S</b> = 0.315 × 10	<b>T</b> = 2.352 × 10

**U**= 0.338 ÷ 100 **W** = 0.00448 × 1000 **Y** = 0.0315 × 10

23.52	31500	0.0338	0.00315	2.352	0.448	0.448	0.0338	3.15	23.52

4480	0.0338	23.52	448	2.352	0.2352	0.00338	315	2.352	23.52

2.352	3.15	23.52	31500	0.0338	0.315	235.2	23.52	23.52	44.8

Answer:

#### Question 4:

Ali thinks of a number. He multiplies his number by 10, subtracts 50 and then divides his answer by 1,000. He gets 0.062. What number did he start with?

#### Lesson 14: Multiplying and Dividing Decimals

#### LI:

• To be able to multiply and divide decimals up to two decimal places by a single digit.

Smartboard lesson: <u>https://app.mymaths.co.uk/59-lesson/starting-to-multiply-decimals</u>

https://app.mymaths.co.uk/63-lesson/divide-decimals-by-whole-numbers

https://mathsbot.com/manipulatives/coins

https://mathsbot.com/manipulatives/placeValueCounters

#### Question 1:

You go into a shop to buy a packet of biscuits, it costs  $\pm 0.82$ , you decide to treat your classmates and buy 3 packets to share. How much will it cost?

Show this in 4 ways



£

#### Question 2:

- a) You buy two movie tickets at £8.75 each, what will your change be from £20?
- b) At a tea shop, one slice of cake costs £2.39. Mr Jones wants the whole cake to himself, there are eight slices altogether, how much will it cost?
- c) It costs £237.12 to hire a coach to Alton Towers. But the school needs to work out how much it will cost to take 12 coaches. Can you work out the answer?

£

Question 3: Multiple choice

Wor	Work out $0.3  imes 4$							
A 0.012	в 1.2	c 0.12	D 12					
Work out $0.5  imes 6$								
А	В	С	D					

Work	Work out $1.2 \times 4$							
A 4.8	A B C D 48 0.48							
Worl	< out 1.5	× 4						
A	В	c 0.60						

#### **Dividing Decimals**

<u>Question 1:</u> A group of 5 friends buy a Dominos pizza and the bill comes to £28.50.

How much does each person have to pay?

<u>Working</u>

Answer	

Question 2: Try dividing these money values

- 1.  $\pm 33.48 \div 6 =$
- 2.  $\pounds 40.11 \div 7 =$
- 3.  $\pounds 68.32 \div 8 =$
- 4.  $\pounds 59.22 \div 7 =$
- 5.  $\pounds 62.64 \div 8 =$

<u>Working</u>		

#### Question 3: Problem Solving

I have 485 Tangfastic, 692 gummy bears and 721 Starmix. I decide to share these equally between me and 3 friends. How many sweets do we get each?

<u>Working</u>

<u>Answer</u>

#### Question 4:

Alex knows that  $9.6 \div 0.4 = 24$ . He uses this information to calculate the answer to  $0.96 \div 0.04$ . What is his answer? Explain.

#### **Question 5: Intelligent Practice**

#### **Multiplication**

#### Division

1.	30 × 40=	1. 50 ÷ 10=
2.	3 × 40=	2. 50 ÷ 20=
3.	3 × 400=	3. 50 ÷ 2=
4.	0.3 × 400=	4. 50 ÷ 0.2=
5.	0.3 × 40=	5. 5 ÷ 0.2=
6.	0.3 × 4=	6. 0.5 ÷ 0.2=


**Question 3:** Look at the following temperatures. Place them in order from coldest to warmest.

a)	-18°C	-17°C	-12°C	27°C	30°C	25°C	22°C
b)	4°C	29°C	-19°C	6°C	11°C	-17°C	19°C

Question 4: Here are 7 cities and their current temperature.

Anchorage	-16°C
Kathmandu	-7°C
Mexico City	24°C
Moscow	-11°C
Mumbai	33°C
Oslo	-1°C
Tokyo	0°C

- a) How much hotter is Mexico City than Moscow?
- b) How much colder is Kathmandu than Tokyo?
- c) If the temperature rises in Oslo by 9°C what will be its new temperature?
- d) What is the temperature difference between the coldest and hottest cities?

# Question 5: [IMC 2001 Q1]

Between which of the following pairs of numbers is there the greatest difference?

- o -3,8
- o -5, -13
- o **1,11**
- o **4, -5**
- -6, -15

Working:

## Question 6:

If David spends more money than he has in his bank account, he will have a negative amount of money in his account. If David has £5.00 in the bank and spends £10.00, how much money does he have in his account?

# Question 7:

Alice says that 12 is greater than 6, so -12 is greater than -6. Is Alice correct? Explain your answer

#### Question 8:

What is halfway between -32 and -38?

#### Question 9: [Kangaroo Pink 2016 Q5]

Little Lucas invented his own way to write down negative numbers before he learned the usual way with the minus sign in front. Counting backwards, he would write: 3, 2, 1, 0, 00, 000, 0000, ....

What is the result of 000+000000+0000 in his notation?

# Lesson 16: Simplifying and Equivalent Fractions

MTH: 2-07c

#### LI:

- To be able to simplify fractions
- To be able to identify and find equivalent fractions

#### Smartboard lesson:

Simplifying Fractions from no.5 <a href="https://app.mymaths.co.uk/1771-lesson/ordering-and-simplifying-fractions">https://app.mymaths.co.uk/1771-lesson/ordering-and-simplifying-fractions</a>

Equivalent Fractions with Bar Model <a href="https://app.mymaths.co.uk/6030-lesson?hasFlash=true">https://app.mymaths.co.uk/6030-lesson?hasFlash=true</a>

# Question 1: Example - Problem Pair

Consider the following

Worked Example	Your Turn
$\frac{6}{20} =$	$\frac{6}{18} =$

## **Question 2:** Intelligent Practice

1. $\frac{6}{12}$ =	9. $\frac{25}{35}$ =	17. $\frac{12}{15}$ =
2. $\frac{3}{12}$ =	10. $\frac{28}{35}$ =	18. $\frac{12}{16}$ =
3. $\frac{5}{12}$ =	11. $\frac{35}{28}$ =	<b>19</b> . $\frac{12}{17} =$
4. $\frac{4}{12}$ =	12. $\frac{35}{35}$ =	20. $\frac{12}{18} =$
5. $\frac{8}{12}$ =	13. $\frac{3}{3}$ =	<b>21</b> . $3\frac{12}{18} =$
6. $\frac{10}{15}$ =	14. $\frac{0}{3}$ =	22. $6\frac{12}{18} =$
7. $\frac{20}{30}$ =	15. $\frac{15}{3}$ =	23. $\frac{612}{18} =$
8. $\frac{21}{35}$ =	16. $\frac{3}{15}$ =	24. $\frac{603}{18} =$

# Question 3:

- a) How many equivalent fractions can you find for  $\frac{1}{2}$ ?
- b) How many equivalent fractions can you find for  $\frac{1}{3}$ ?
- c) What is the relationship between the numerator and denominator in each set of equivalent fractions?

Question 4: How many ways can you express the fraction shown?



# Question 5: [IMC 2018 Q5]

The adult human body has 206 bones. Each foot has 26 bones. Approximately what fraction of the number of bones in the human body is found in one foot?

Question 6: [JMC 2015 Q18]						
Each of the fractions $\frac{2637}{18459}$ and $\frac{5274}{36918}$ uses the digits 1 to 9 exactly once.						
The first fraction simplifies to $\frac{1}{7}$ . What is the simplified form of the second fraction?						



For this method we need to remember that percentage is "out of 100"

We will use a scaling method to work out our answer

#### Example 1:

 $\frac{17}{20}$  of pupils in a class have brown hair. What percentage is this? What is this as a decimal?

$$\times 5 - 17 \text{ out of } 20 \rightarrow \times 5$$
  
? out of 100  $\rightarrow \times 5$ 

If we use our scaling method we can see that we can multiply by 5 to make our fraction out of 100, this then is easier to convert to a percentage and a decimal.

 $17 \times 5 = 85$ , therefore our answer is **<u>85%</u> or 0.85** 

## Example 2:

 $\frac{3}{20}$  of pupils in a class have brown hair. What percentage is this?

$$\times? - \left\{ \begin{array}{c} 3 \text{ out of } 20 \\ 2 \text{ out of } 100 \end{array} \right\} \times?$$

Answer = \_\_\_\_\_

# <u>Example 3:</u>

Write  $\frac{12}{25}$  as a percentage and then a decimal

$$\times? - \left\{ \begin{array}{c} 12 \text{ out of } 25 \\ 2 \text{ out of } 100 \end{array} \right\} \times?$$

Answer = \_\_\_\_\_

#### <u>You try:</u>

Question 1: Fill out the following table

Fraction	Decimal	Percentage
$\frac{1}{5}$		%
_	0.1	%
		75%
<u>23</u> 50		%
_	0.125	%
		36%

#### Question 3:

In a school, 34% of pupils come by bus.  $\frac{7}{25}$  come by car and the rest walk.

What percentage of pupils come to school by walking?



Question 8: Complete the table.

Decimal	Fraction	Percentage
0.35	35 100	35%
0.27		
0.6		
0.06		

<u>Question 9:</u> Charlie says that  $0.30 = \frac{3}{10}$ , and Becca says that  $0.30 = \frac{30}{100}$ . Who is correct? Explain your answer.

**Question 10:** Frank says  $\frac{3}{4}$  as a decimal is 3.4. Explain why Frank is wrong.

<u>Question 11:</u> Jimmy says, ''I can't convert  $\frac{420}{700}$  to a percentage because the denominator is greater than 100.'' Do you agree with Jimmy? Explain your answer.

# Second Level Numeracy Course MNU: 2-07b Lesson 19: Fractions of a Quantity LI: To be able to calculate a fraction of a quantity Smartboard lesson: with bar modelling https://app.mymaths.co.uk/5855-lesson/modelling-fractions-of-amounts https://mathsbot.com/manipulatives/bar Question 1: Use the bar modelling to find 21 a) $\frac{1}{3}$ of 21 21 b) $\frac{2}{3}$ of 21 35 c) $\frac{1}{5}$ of 35 35 d) $\frac{4}{5}$ of 35 Question 2: Annabelle is watching a programme that is 1 hour (60 minutes) long.

She has watched  $\frac{1}{4}$  of it.

- a) How long has she been watching for?
- b) How much of the programme is left to watch?



# Question 3:

Pam has fed 8 animals at the farm.

She has fed  $\frac{1}{4}$  of the animals so far.

How many animals are there altogether?

# Question 4:

George is reading a book. The book has 200 pages.

George has read exactly  $\frac{4}{5}$  of the book.

- a) How many pages has George read?
- b) How many pages does he still have to read?

# Question 5

Harry says, " $\frac{2}{3}$  of my money is £24"

Alice says, " $\frac{3}{4}$  of my money is £27"

Alice claims they both have the same amount of money. Is she correct? Use bar modelling.







# Question 6: [JMC 2002 Q3]

Which of the following has the biggest value? Use bar modelling.

$\circ \frac{1}{2}$ of 24	Working
$\circ \frac{1}{3}$ of 36	
$\circ \frac{1}{4}$ of 60	
$\circ \frac{1}{5}$ of 50	
$\circ \frac{1}{6}$ of 84	

# Question 7: [JMC 2012 Q8]

Tommy Thomas's tankard holds 480ml when it is one quarter empty. How much does it hold when it is one quarter full? Use bar modelling.



# Lesson 20: Expressing Percentages and Converting from Fractions to Percentages

#### LI:

- To be able to convert between a fraction and a percentage
- To be able to express a percentage pictorially

Smartboard lesson:

- With Bar modelling <a href="https://app.mymaths.co.uk/6034-lesson/new-modelling-percentages">https://app.mymaths.co.uk/6034-lesson/new-modelling-percentages</a>
- <u>https://mathsbot.com/manipulatives/bar</u>

Question 1: Represent the following percentages on a hundred square:



What fraction of each hundred square is shaded?

Write these fractions as percentages and decimals



MNU: 2-07b

Question 3: Fill in the missing numbers:



Second Level Numeracy Course	1
Lesson 21: Finding a Percentage of a Quantity: MNU: 2-07b	L
<ul><li>LI:</li><li>To be able to calculate a percentage of a quantity</li></ul>	1
Smartboard lesson:	
<ul> <li>With Bar modelling <u>https://app.mymaths.co.uk/6034-lesson/new-modelling-percentages</u></li> <li><u>https://mathsbot.com/manipulatives/bar</u></li> </ul>	
Question 1: Use bar models to show the following	
a) Tony had £350. He spent 50% on a hotel weekend break. How much did Tony pay for the holiday?	
£350	
b) Abbie weighed 72 kilograms. She went on a diet and lost 25% of her weight. How many kilograms did she lose? 72kg	
c) Coleen weighed 60 kg. On a diet, she lost 10% of her weight. What was her new weight?	
kg l	
	49

Second Level Numeracy	Course
Question 2: Moe has mad	de £220 from his wages working in a bar. He decides to spend 30%
of this amount on a food	shop. How much is this?
	£
	λ
In different weeks he sp	ends a different percentage on his food shop. How much would each
food shop be if he spent.	.?
a) 40% of £220	Working
b) 20% of £110	working
c) 30% of £440	
d) 90% of £460	

Question 3: If 7 is 10% of a number, what is the number? Set up an appropriate bar to model this problem.

Second Level Numeracy Course						
Question 4: [SMC 2009	Q1]	Working				
What is 20% of 30% of :	£600?					
Question 5: Extra prac	tice					
Find the following:						
a) 50% of 300 b) 50% of 30 c) 50% of 60	d) 25% of 300 e) 25% of 30 f) 25% of 60	g) 10% of 300 h) 10% of 30 i) 10% of 60	j) 1% of 300 k) 1% of 30 l) 1% of 60			

# <u>Working</u>

Lesson 22: Budgeting, Profit and Loss

#### LI:

- To be able to calculate the profit and loss made on items
- To be able to make plans based on budgets

Smartboard lesson:

https://app.mymaths.co.uk/112-lesson/budgeting

Question 1: Rasha was holding a cake sale at school. He spent £15.68 on baking supplies and made £37.62 on the day.

How much profit did he make?

Question 2: Daniel bought some football collectables for £162. Two years later he sold it on eBay for £98.50.

How much of a loss did he make?

<u>Question 3:</u> Amrit bought a designer coat for £326 and a designer handbag for £233. Last month, she sold the coat for £144 and the handbag for £247.

How much profit or loss did she make?

<u>Question 4:</u> Stephanie bought her first flat for £165,000. She sold it and made a loss of £3422.

How much she sell the flat for?

MNU: 2-09a-c



# Cinema Visit Budget



You are going to plan a budget for a visit to the cinema.

You will need to include the return bus fares, movie ticket and any food or drinks required for yourself (1 person)

You only have  $\pounds 25$  to spend. You do not have to spend all the budget, as long as you meet the trip requirements.

Item		Price
Bus fare	One way	£2.05
Movie ticket	Child	£10.50
Movie Ticket 3D	Child	£14.50
3D glasses	×1	£1.00
Popcorn	Small	£5.50
Popcorn	Medium	£6.00
Popcorn	Large	£6.25
Drink	Medium	£4.50
Drink	Large	£5.75
Bag of Iollies	190g	£3.00
Ice cream	250ml	£3.50
Combo (popcorn and drink)	Medium	£10.00
Combo (Popcorn and drink)	Large	£11.00

Plan your cinema visit below

Make sure to include your return bus fare, movie ticket and any soft drinks/food you wish to purchase.

Make sure to add the total cost and work out any change you may receive.

# <u>Working</u>

#### Extension:

- (i) Plan a cinema trip for 2 people. You have a budget of  $\pm 36$ .
- (ii) Plan a cinema trip for a family of 3 siblings who have a budget of  $\pm$ 75. Spend as much of the budget as you can.
- (iii) Can 2 children get a bus to the cinema, see a 3D movie, share an ice-cream and a small bag of popcorn, get the bus home for under £47? Explain.

# Lesson 23: Time

LI:

• To be able to convert between hours and minutes and 12 and 24 hour time

Smartboard lesson: <u>https://app.mymaths.co.uk/5774-lesson/time-2</u>

# Question 1:

Complete the table below

Time in Words	24 Hour Clock	12 Hour Clock	Analogue
half past seven o'clock in the evening		7:30 p.m.	
		11:00 a.m.	7 6 5
	14:15		$   \begin{array}{c}       11 \\       12 \\       12 \\       12 \\       2 \\       2 \\       4 \\       3 \\       8 \\       7 \\       6 \\       5 \\   $
		5:30 p.m.	
		1:21 p.m.	$ \begin{array}{c} 11 & 12 \\ 10 & 2 \\ 4 & 3 \\ 8 & 4 \\ 7 & 6 \\ 5 \\ \end{array} $
		6:43 p.m.	
eighteen minutes past midnight			

55

#### Question 2:

a) One hour = \_\_\_\_ minutes b) One minute = \_\_\_\_ seconds

- c) Two hours = \_\_\_\_ minutes
  d) Three minutes = \_\_\_\_ seconds
  e) Half an hour = \_\_\_\_ minutes
  f) \_\_\_\_ minutes = 240 seconds

# Question 3:

Josh reads a chapter of his book in 5 minutes and 28 seconds

Tom reads a chapter of his book in 300 seconds

Who reads their chapter the quickest?

# Question 4:

Five friends run a race and their times are shown in the table.

- a) Which child finished the race the closest to 2 minutes
- b) What was the difference between the fastest Andslowest time?

Give your answer in minutes and seconds.

Name	Time
Eva	114 seconds
Dexter	199 seconds
Teddy	100 seconds
Whitney	202 seconds
Ron	119 seconds

#### Extension:

Answer the questions and cross out the answers on the grid. Put the 5 answers that are left in the boxes below and find the missing time..

8:10 pm	01:10	16:20	6:10 pm	4:30 am
13:30	7:30 pm	10:30 pm	15:10	4:30 pm
17:30	20:30	18:30	18:30	14:30
14:30	09:15	19:30	3:15 pm	3:15 am
15:30	17:15	10:30 am	11:15 pm	22:10

6:30 pm to 24-hour	16:30 to 12-hour	04:30 to 12-hour	5:15 pm to 24-hour
4:20 pm to 24-hour	8:30 pm to 24-hour	15:15 to 12-hour	03:15 to 12-hour
10:30 to 12-hour	19:30 to 12-hour	3:10 pm to 24-hour	18:10 to 12-hour
2:30 pm to 24-hour	1:30 pm to 24-hour	1:10 am to 24-hour	10:10 pm to 24-hour
20:10 to 12-hour	23:15 to 12-hour	9:15 am to 24-hour	22:30 to 12-hour

Missing time





These clocks indicate the start of the activities for a day at a TRNSMT musical festival and when they are due to end.

For how long did the festival last that day?



# Question 2:

A late night film started at 2250 and lasted for 2 hours 15 minutes. When did it finish?

Use the counting on method to help you

#### Question 3:

Celtic are set to play Hearts at the weekend. If the game starts at 14:00 and the match lasts 90 minutes plus a break at half time for 15 minutes, what time will the full match finish?

Question 4: [JMC 2019 Q1]

How many minutes is it from 23:35 today to 01:15 tomorrow?

# Question 5: [JMC 2015 Q2]

It has just turned 22:22. How many minutes are there until midnight?

# Question 6: [JMC 2017 Q2]

Nadiya is baking a cake. The recipe says that her cake should be baked in the oven for 1 hour and 35 minutes. She puts the cake in the oven at 11:40 am. At what time should she take the cake out of the oven?

# Question 7:

[JMC 2007 Q2] My train was scheduled to leave at 17:40 and to arrive at 18:20. However, it started five minutes late and the journey then took 42 minutes. At what time did I arrive?

o <b>18:21</b>	Working
o <b>18:23</b>	
o <b>18:25</b>	
o <b>18:27</b>	
o <b>18:29</b>	

# Second Level Numeracy Course Lesson 25: Distance, Speed and Time MNU: 2-10c LI:

• To be able to make links between time, distance and speeds and carry out calculations

Smartboard lesson: <u>https://app.mymaths.co.uk/296-lesson/speed</u>







$$D = S \times T$$

# Question 1:

A scooter travelled 350 miles, taking a total of 7 hours to complete the journey.

What was the <u>average speed</u> of the scooter?

# Question 2:

A plane left Glasgow at 7.45 pm and flew 1230miles to Lyon in France, arriving at 10.45 pm.

- a) How long did the journey take?
- b) What was the plane's <u>average speed</u>?

# Question 3:

A police car chased a stolen van for 2 hours, driving at an average speed of 70 km/hr. What <u>distance</u> had the police car covered?

#### Question 4:

A police car chased a stolen van for 2 hours, driving at an average speed of 70 km/hr. What <u>distance</u> had the police car covered?

# Question 5:

A cargo ship travelled through 36 miles of shallow water ata slow speed of 4 mph. <u>How long</u> did it take the ship to go through this dangerous part of its journey?

#### Extension:

Use the correct formula to answer these questions:

- a) Distance 115 miles. Time 5 hours.
- b) Distance 180 km. Speed 45 km/hr.
- c) Speed 65 mph. Time 4 hours.
- d) Time 14 hours. Distance 280 miles.
- e) Speed 200 km/hr. Distance 4800 km.
- f) Time 7 hours. Speed 308 mph.
- g) Distance 320 km. Speed 40 km/hr.
- Find the average speed. Find the time taken. Find the distance travelled. Find the average speed. Find the time taken. Find the distance covered. Find the time taken.

<u>Working</u>

#### Lesson 26: Perimeter

#### LI:

• To be able to calculate the perimeter of simple 2D shapes

Smartboard lesson: <u>https://app.mymaths.co.uk/265-lesson/perimeter</u>

# **Discussion**

- > What is perimeter? \_\_\_\_\_
- > When do you need to find the perimeter in real life?

# Question 1:

a) Work out the perimeter of the shape:

<u>Working</u>

		 с. 1		

- b) Create a shape that has the same perimeter
- c) Create a shape that has 5cm more than the perimeter above
- d) Create a shape that has double the perimeter of that above







# Question 2:

What is the perimeter of these shapes in cm



snupes in	CIII?		



#### Question 3: [JMC 2006 Q14]

In Scottish football the SFA has a Law that states that the football field must be rectangular and have length from 100 to 130 yards, and width from 50 to 100 yards.

- a) Calculate the maximum perimeter a football pitch can take
- b) Calculate the minimum perimeter that a football pitch can take
- c) What is the difference between the biggest and smallest?



cm

Maximum pitch

Minimum pitch

Question 4: Calculate the perimeter of each of these rectangles, don't forget units:











Shape	Width	Height	Length	Volume (cm³)
А				
В				
С				

# Question 2:

Sam has built a shape that has a volume of  $12cm^3$ . Using  $1cm^3$  blocks, build a shape that has:

- The same volume as Sam's
- Half the volume as Sam's
- Three times the volume of Sam's

# Question 3:

Calculate the volume of the following:









3	hours		minutes		seconds
	hours	300	minutes		seconds
	hours		minutes	32400	seconds
	hours	90	minutes		seconds
5.5	hours		minutes		seconds
24	hours		minutes		seconds
	hours		minutes	8100	seconds

# Problem Solving:

#### Question 5:

A recycling plant collects a total of 63.4 kg of plastic in 80 containers. What is the average mass of plastic in each container in **grams**?

#### Question 6 :

Carpet tiles are 41 cm by 30 cm. Ryder uses 48 tiles to cover his floor. What is the area of his floor in square metres?



# Question 1:

Place the following decimals on the number line


# Second Level Numeracy Course

Question 4: Complete the following number lines.



# Question 5: Record the scale in each picture.



Lesson 31: Rounding

MNU: 2-01a

#### LI:

- To be able to round whole numbers to the nearest 1000, 10000 and 1000000
- To be able to round decimals to the nearest whole number and up to two decimal places

Smartboard lesson:

Rounding Whole numbers <u>https://app.mymaths.co.uk/71-lesson?hasFlash=true</u>

Rounding Decimals <u>https://app.mymaths.co.uk/74-lesson/decimal-places</u>

### Question 1: Round these populations to the nearest 100,000

City	Population	Rounded to the nearest 100,000
Leeds	720,492	
Durham	87,559	
Sheffield	512,827	
Birmingham	992,000	

# Question 2:

Round £450, 985 to the nearest

- a) £10 \_\_\_\_\_
- b) £100 \_\_\_\_\_
- c) £1,000 \_\_\_\_\_
- d) £10,000 \_\_\_\_\_
- e) £100,000 \_\_\_\_\_

# Question 3:

At a festival 218,712 people attend across the weekend

Tickets come in batches of 100,000.

How many batches should the organisers buy?

Explain why this goes against the rounding rule.

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**<u>Question 4:</u>** Intelligent practice

Worked Example	Your turn	
8.7337	8.3773	
Round to:	Round to:	
1DP	1DP	
2DP	2DP	
3DP	3DP	

Number	1 decimal place	2 decimal places	3 decimal places
1. 0.1234			
2. 0.2345	1 - Carlos and a second		
3. 0.3456			
4. 0.4567			
5. 0.04567			
6. 0.40567		stan in the second	
7. 0.45067			
8. 9.45067			
9. 9.45967			
10. 9.95967			

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### Question 5:

Alex says 45.05 rounded to 1 decimal place is 45. Do you agree with Alex? Explain.

### Question 6:

Round the following numbers to one decimal place and explain why there is an odd one out:

5.63 5.36 6.53

### Question 7:

When a number is rounded to the nearest whole number it is 1. When the same number is rounded to one decimal place, it is 0.5. What could the number be?