Level 7 Homework booklet 1

NAME _____

TEACHER _____

Task	Topic	Date Set	Date Completed	☺	☹
1	Multiplying and dividing				
2	Estimating and rounding				
3	Estimating 2				
4	Estimating 3				
5	Use of a Calculator				
6	Mental Questions				
7	Standard Form				
8	Substituting Negative Numbers into Formula				
9	Sequences				
10	Nth term				

After you have completed each homework self-assess your understanding and the date you completed it

My Maths

Please see back cover for **MyMaths** tasks

Parents

Please read note on back cover

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MULTIPLYING AND DIVIDING

Name:

Assessment Criteria: Understand the effects of multiplying and dividing by numbers between 0 and 1

No calculator allowed!

1. Write down three division calculations where the answer is bigger than the starting number

   _____,   _____,   _____

2. Write down two numbers, one of which is between 0 and 1, which multiply to give an answer of 40.

   _____ and _____

3. What number is represented by the '♣' symbol below?

   $$150 \div ♣ = 225$$

   ♣ = _____

4. What is the same about the following four calculations? What is different?

   $$0.8 \div 0.1$$
   $$16 \times 0.5$$
   $$1.6 \div 0.5$$
   $$1.6 \div 0.2$$

5. What is the value of 0.6×0.1?

   _____

| Overall, I think my success level is: | Low ○ ○ ○ ○ High |

Q	MULTIPLYING AND DIVIDING	☺	☹
	I understand the effect of multiplying by a number between 0 and 1		
	I understand the effect of dividing by a number between 0 and 1		
	I can justify generalisations, arguments or solutions		

I need to practise …

ESTIMATING AND APPROXIMATING

Name:

Assessment Criteria: Make and justify estimates and approximations of calculations; estimate calculations by rounding numbers to one significant figure and multiplying and dividing mentally

No calculator allowed!

1. Find an approximate value of the following calculations:

   a) $\dfrac{192.3 \times 87.1}{26.8 \times 20.7}$

   _____

   b) $\dfrac{2.95 \times 5.1^3}{4.56}$

   _____

   c) $5.92 \times 33 + (2.82 \times 4.8^2)$

   _____

2. Write down an example of a division calculation, involving decimals, that approximates to 60

   _____

3. Is the following statement always true, sometimes true or never true:

   'Rounding up the numbers in a calculation will produce an over-estimate'

   Give reasons for your answer

Overall, I think my success level is:

Low			High
○	○	○	○

Q	ESTIMATING AND APPROXIMATING	☺	☹
	I can round numbers to one significant figure		
	I can calculate mentally once values in a complex calculation have been rounded		
	I can identify efficient approaches, such as cancelling common factors, in order to make mental calculations easier		
	I can justify generalisations, arguments or solutions		
I need to practise …			

1) Which one is correct (a) or (b)

	Question	(a)	(b)
A	**4 x 0.8**	3.2	5
B	**5.1 x 0.07**	0.357	72.9
C	**360 x 0.5**	180	720
D	**34 x 0.009**	0.306	3777.8
E	**2 ÷ 0.4**	0.8	5
F	**3 ÷ 0.02**	0.06	150
G	**16 ÷ 0.04**	400	0.64
H	**23 ÷ 0.8**	18.4	2.875
I	$\dfrac{\textbf{500}}{\textbf{0.4}}$	200	1250
J	$\dfrac{\textbf{300}}{\textbf{0.8}}$	375	240
K	$\dfrac{\textbf{4}}{\textbf{1.2} - \textbf{0.7}}$	8	2
L	**6 x (2.3 – 1.9)**	2.4	15
M	**0.7 x 0.8**	0.875	0.56
N	$\dfrac{\textbf{8}}{\textbf{1.2} - \textbf{0.8}}$	3.2	20
O	**0.3 x 23**	76.7	6.9

2) Which of these are true or false? Give a reason for each answer.

a)   5 x 0.2 = 1

b)   6 ÷ 0.4 = 2.4

c)   10 x 0.2 = 50

d)   40 ÷ 0.02 = 2000

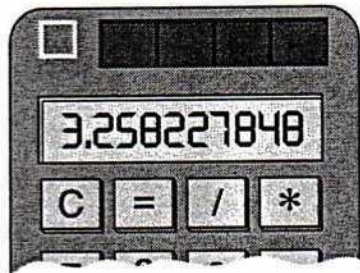e) $\dfrac{8}{0.4} = 20$

f) $\dfrac{7}{1.1 - 0.9} = 1.4$

Task 3 **Estimating 2**

1)

Lara worked this out on her calculator.

$$\frac{19\cdot8 \times 3\cdot9}{19\cdot8 - 3\cdot9}$$

This is what her calculator showed.

Write down a calculation Lara could do in her head to check whether her answer is correct.

2)

Estimate.

$$\frac{\sqrt{26} \times 1\cdot84}{0\cdot48}$$

3)

Estimate the answer to this calculation.
Show clearly the values you use.

$$\frac{\sqrt{143\cdot7}}{0\cdot49}$$

4)

Estimate the answer to this calculation.
Show clearly the values you use.

$$\frac{19\cdot7 \times 7\cdot9}{0\cdot48}$$

5)

Jim has done this calculation.
His answer is wrong.

Explain how you can tell the answer is wrong without working it out exactly.

$$58\,900 \div 62 = 95$$

6)

Estimate the answer to this calculation.
Show clearly the values you use.

$$\frac{9\cdot6^2}{0\cdot47}$$

7)

Estimate the answer to this calculation.
Show clearly the values you use.

$$\frac{\sqrt{143\cdot7}}{0\cdot49}$$

8)

Two of these calculations are wrong.

Which two are wrong?

Explain how you can tell that they are wrong **without** doing the calculation.

(a) $15 \times 1\cdot7 = 25\cdot5$ **(b)** $0\cdot6 \times 12 = 21$

(c) $27 \div 45 = 0\cdot6$ **(d)** $25 \div 18 = 0\cdot8$

Task 4 Estimating (3) exam questions

1)

State whether or not this calculation is correct.

$$18 \cdot 2 \div 0 \cdot 91 = 200$$

Show how you decided.

The calculation is .... because ....

....

....[2]

2)

The answers to these calculations are wrong.
Explain why the answers are wrong.
Do **not** do the full calculation.

(a) $23 \cdot 4 \times 1 \cdot 1 = 22 \cdot 74$

....

.... [1]

(b) $\dfrac{54 \cdot 6}{0 \cdot 4} = 21 \cdot 84$

....

.... [1]

3)

Sam and Michael were comparing their mathematics homework.
They had different answers to one of the questions.

$$\frac{2 \cdot 31}{1 \cdot 1 - 0 \cdot 4} = 3 \cdot 3 \qquad\qquad \frac{2 \cdot 31}{1 \cdot 1 - 0 \cdot 4} = 1 \cdot 7$$

Sam's work   Michael's work

Explain how you can tell which one is wrong without doing the full calculation.

....is wrong because ....

....

.... [2]

4)

State whether or not this calculation is correct.

$$18 \cdot 2 \div 0 \cdot 91 = 200$$

Show how you decided.

The calculation is .... because ....

....

....[2]
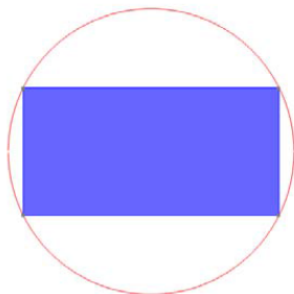
USE OF A CALCULATOR

Name:

Assessment Criteria: Use a calculator efficiently and appropriately to perform complex calculations with numbers of any size, knowing not to round during intermediate steps of a calculation

1. The diagram below shows a 3 cm by 6 cm rectangle inscribed in a circle. What is the area of the circle?

_____cm^2

2. What is the same/different about the following:

a) $\dfrac{3.9 - 4.5}{2.5}$

b) $(-2.4)^3$

c) $\dfrac{3 \times 0.2^2}{0.8 \times 0.9 - 0.22}$

d) $(-4.8)^2$

Overall, I think my success level is:

Low   High

○ ○ ○ ○

Q	USE OF A CALCULATOR	☺	☹
	I can use my calculator to carry out calculations involving π		
	I can use my calculator to carry out calculations involving brackets		
	I can use my calculator to carry out calculations involving powers		
	I can use my calculator to carry out calculations written as a fraction		
	I can use my calculator to carry out calculations involving combinations of these things		
	I know when it is appropriate to round when carrying out a complex calculation		
	I can justify generalisations, arguments or solutions		

I need to practise …

This decimal number line shows three dividers that are **equidistant** between 0 and 1.

0   1
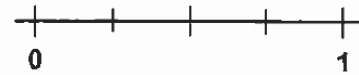
(For the following questions, draw a decimal number line to help you.)

Levels
6 - 7

1) Find three numbers that are of equal distances between 3 and 4.

2) Find three numbers that are of equal distances between 0.1 and 0.2.

3) Find seven numbers that are of equal distances between 1 and 2.

Level 7 question

Each of these calculations has the same answer, 60. Fill in each gap with a number.

2.4 x 25		60 ÷ 1

= 60

0.24 x		6 ÷ ......
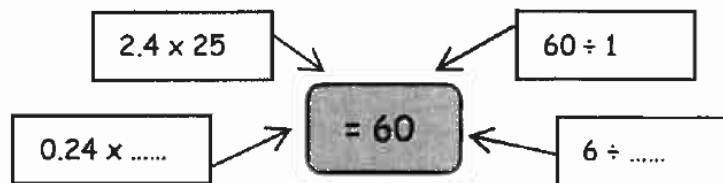
2 marks

Level 7 question - Write the missing numbers in these multiplication grids.

a)

×	8	
9	72	
-6		30

b)

×	0.2	
3		1.2
		6

3 marks

Level 8 question – Write a number in each box to make the inequalities true.

a) ☐ ÷ ☐ < **-1**

1 mark

b) **-1** < ☐ ÷ ☐ < **0**

1 mark

Level 7 Questions

1. A three-digit number is multiplied by a two-digit number. How many digits could the answer have? Write the minimum number and the maximum number of digits that the answer could have. You must show your working. 2 marks

2. Look at these number cards.

0.2	2	10	0.1	0.05	1

a) Choose the two cards which give the lowest possible answer when they are multiplied.
_____ × _____ = 2 marks

b) Choose the two cards that give the answer 100 when divided.
_____ ÷ _____ = 1 mark

7	▪ 0.034 × 0.046

Task 7 Standard Form

1. Write these in standard form

3000000 = _____
40000 = _____
523000 = _____
254100000 = _____
1829000000 = _____
102320000000000 = _____
143.2 = _____

2. Write these as normal numbers

6×10^7 = _____
3×10^9 = _____
6.2×10^5 = _____
7.12×10^8 = _____
4.356×10^{12} = _____
1.234×10^6 = _____
3.245×10^2 = _____

3) Write these as normal numbers

a $\quad 6 \times 10^{-7}$

b $\quad 3 \times 10^{-10}$

c $\quad 4 \times 10^{-11}$

d $\quad 7 \times 10^{-1}$

e $\quad 3.664 \times 10^{-15}$

f $\quad 3.93 \times 10^{-17}$

g $\quad 4.609 \times 10^{-13}$

h $\quad 4.966 \times 10^{-3}$

i $\quad 3.88543 \times 10^{-2}$

j $\quad 3.05 \times 10^{-7}$

4) Write these in standard form

a   0.09

b   0.00000000000008

c   0.00000000004

d   0.000000000000000006

e   0.0000000006699

f   0.000000594

g   0.0000000000000000003055

h   0.00000000145

i   0.0000000872

j   0.00000986

5) The earliest dinosaurs existed on earth 2.05 $\times 10^8$ years ago.
Dinosaurs became extinct 6.5×10^7 years ago.
For how long did dinosaurs exist on earth?

6)

The distance between the Moon and the Earth is 384 400 km.
(a) Write this distance in standard form.
(b) A total eclipse of the Sun occurred in August 1999 when the Earth, the Moon and the Sun were in a straight line.

NOT TO SCALE

●   ●   ●
Earth   Moon   Sun

The distance between the Earth and the Sun is 1.496×10^8 km.
Find the distance between the Moon and the Sun at the time of the eclipse.
Give your answer in standard form.

Task 8 Substituting negative values in formula

A)

If $a = -3$ $b = 5$ $c = 12$ $d = 2$ match the expression to the correct value

Expression	Value
$6b$	① 1
$\dfrac{c}{d}$	② 3
$a + 14$	③ 6
b^2	④ -12
bd	⑤ 7
$4a$	⑥ 2
$3b^2$	⑦ 1
$b^3 + 100$	⑧ -9
a^2	⑨ 225
$a - 6$	⑩ 9
$\dfrac{a + b}{d}$	⑪ 1
$2a^2$	⑫ 0
$c + 4a$	⑬ 1

B) If $x = -3$ $y = -4$ $z = 3$ $w = 12$ fill in the missing boxes

$B = \dfrac{w}{7}$

$G = 5z + 2w$

$L = z^4$

$V = 20 - 2y$

$K = w^2$

$S = xw$

$M = x^2$

$N = x + y$

$H = 2(w + y)$

$J = 4z^2$

$D = 4x$

$C = y + 6$

$R = 3y^2$

$A = 5z$

$T = 2(w - y)$

$F = w + x$

$Q = x - y$

$U = 3(2w + 5y)$

$P = z - y$

$E = x - z$

A	B	C	D
E	F	G	H
J	K	L	M
N	P	Q	R
S	T	U	V

SEQUENCES

Name:

Assessment Criteria: Find the next term and n^{th} term of quadratic sequences and functions and explore their properties

1. Find the first three terms of the sequence with an nth term of $T(n) = 2n^2 - 7$

_____, _____, _____

2. Find the nth term of each of these sequences:

   a) -3, 0, 5, 12, 21, …

   $T(n) =$ _____

   b) $\dfrac{1}{2}, \dfrac{1}{6}, \dfrac{1}{12}, \dfrac{1}{20}, \dfrac{1}{30}, \ldots$

   $T(n) =$ _____

3. Find a way to continue a sequence starting 1, 2, … so that it has a quadratic n^{th} term. Explain your answer.

4. Decide whether each of the following statements is always true, sometimes true, or never true. Explain your answer in each case.

   a) Sequences with an equivalent second difference have a quadratic n^{th} term

b) Sequences with an unequal first difference pattern have a quadratic n^{th} term

c) The second difference for a quadratic sequence is always 2

	Low	High
Overall, I think my success level is:	○ ○ ○ ○	

Q	SEQUENCES	☺	☹
	I can find the terms of a quadratic sequence given its nth term		
	I can find the nth term of a quadratic sequence		
	I can find the nth term of a sequence that is connected to a quadratic rule		
	I know some of the properties of quadratic sequences		
	I can justify generalisations, arguments or solutions		
I need to practise …			

Task 12 nth Term

nth Term

Level 7 question

3. (a)   Draw lines to match each nth term rule to its number sequence.

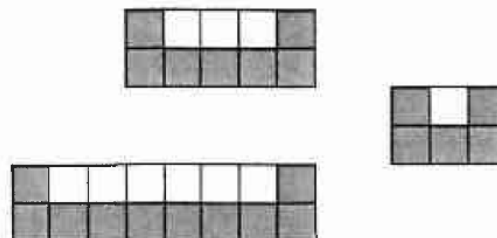| nth term	Number sequence
$4n$	4, 7, 12, 19, ...
$(n + 1)^2$	4, 8, 12, 16, ...
$n^2 + 3$	4, 9, 16, 25, ...
$n(n + 3)$	4, 10, 18, 28, ...

2 marks

(b)   Write the first four terms of the number sequence using the nth term rule below.

$n^3 + 3$ —— , —— , —— , ——

2 marks

Level 8 question - Each pattern below shows a square grid that is 2 squares high. Only one square at each end of the top row is shaded. All squares in the bottom row are shaded.

Imagine one of these patterns that has n squares in the bottom row. Write an expression for the fraction of the pattern that is shaded.   2 marks

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7	▪ Find the nth term for the following sequence: 2×3, 3×4, 4×5, 5×6, ...
	▪ Find the nth term for the following sequence: $\dfrac{1}{2}, \dfrac{1}{6}, \dfrac{1}{12}, \dfrac{1}{20}, \dfrac{1}{30}, ...$

MyMaths : Here are the MyMaths tasks for level 7.

Your teacher will instruct which of these to do.

Alternatively can use MyMaths to help with topics you are unsure of and to revise topics.

BOOSTER PACKS

Topic	*How to find* : Go to **Boosters** then	% Scored	Self Assessment		
Arithmetic	Ds to C's (Booster Pack)		☺	☺	☹
Number and Powers	Ds to C's (Booster Pack)		☺	☺	☹
Decimals	Ds to C's (Booster Pack)		☺	☺	☹
Sequences, Formula	Ds to C's (Booster Pack)		☺	☺	☹
Coordinates, Graphs	Ds to C's (Booster Pack)		☺	☺	☹

OTHER

Topic	*How to find* : Go to **Library** then	% Scored	Self Assessment		
Significant Figures	Number → Estimation and Accuracy		☺	☺	☹
Estimating Calculations	Number → Estimation and Accuracy		☺	☺	☹
Upper and Lower Bounds 1	Number → Estimation and Accuracy		☺	☺	☹
Indices 1	Number → Powers and roots		☺	☺	☹
Equation of a Line 2	Number → Graphs		☺	☺	☹
Quadratic Sequences	Number → Sequences		☺	☺	☹

Parent note about this booklet

This booklet contains several level tasks available for homework along with MyMaths tasks.

The teacher will instruct which level tasks students should complete each week.

Students can do extra MyMaths tasks not set by the teacher at any time It is not intended that the whole booklet should be completed as one homework.

The booklet must be kept safely and any lost booklets will require £1 for a new copy.