

Striving To Improve



Integers

For students aged 11 - 15 years who are underachieving at their year level.



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Teachers' Notes

This resource is focused on the Number and Algebra area of the curriculum for lower ability students and those who need further opportunity to consolidate these core areas in Mathematics.

Each section provides students with the opportunity to consolidate written and mental methods of calculation, with an emphasis on process and understanding.

The section entitled *Understanding Integers* enables students to re-encounter ideas of place value, rounding, estimation, factors, multiples and the concept of a directed number. These activities are a useful way to scaffold a new unit of Mathematics and will help build confidence for lower ability students to attempt more challenging problems at their year level.

The section entitled *Calculating With Integers* walks students through the four core calculations. The activities are designed to guide student learning with minimal input from the teacher and there is a strong emphasis on process and understanding. Students explore addition and subtraction with two and three digit sums and can apply what they have learned to some real life application problems. Similarly, students explore the various levels of multiplication and division before applying them to a variety of applications.

The activities can be used for individual students needing further consolidation in a mainstream classroom or as instructional worksheets for a whole class of lower ability students. The activities range from grade levels of Year 4 through to Year 7 and are appropriate for students requiring extra support in Years 7, 8 and 9.

It is hoped that *Integers* will be used to help teachers provide appropriate resources and support to those students in greatest need. The book as a whole can be used as a programme of work for those students on a Modified Course or Independent Learning Programme. Activities are sufficiently guided so that students can work independently and at their own pace without constant supervision and guidance from the teacher.

* Place Value 3

*** TASK A** Write this number so that the digits are in the correct columns.

Seven million, four hundred and fifty-six thousand, three hundred and twenty-two.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
1 000 000	100 000	10 000	1 000	100	10	1

*** TASK B** Show these numbers on the table below.

	1 000 000	100 000	10 000	1 000	100	10	1
5 498 765							
2 098 634							
4 200 049							
187 685							
280 097							
35 497							

*** TASK C** Write the following numbers in expanded form.

3 487 978

E.g. $(3 \times 1\,000\,000) + (4 \times 100\,000) + (8 \times 10\,000) + (7 \times 1\,000) + (9 \times 100) + (7 \times 10) + (8 \times 1)$.

2 876 543

7 653 012

*** TASK D** Write the place value and the face value for the underlined numbers below.

Number	Place Value	Face Value
3 4 <u>2</u> 5 643	ten thousands	20 000
<u>3</u> 298 765		

Number	Place Value	Face Value
5 36 <u>4</u> 243		
2 <u>5</u> 09 345		

* Counting By ...

* TASK A Complete the number patterns to count by ...

Twos:	2, 4, 6, 8, _____	20
Threes:	3, 6, 9, _____	30
Fours:	4, 8, 12, _____	40
Fives:	5, 10, 15, _____	50
Sixes:	6, 12, 18, _____	60
Sevens:	7, 14, 21, _____	70
Eights:	8, 16, 24, _____	80
Nines:	9, 18, 27, _____	60
Tens:	10, 20, 30, _____	100
Elevens:	11, 22, 33 _____	110
Twelves:	12, 24, 36 _____	120
Thirteens:	13, 26, 39 _____	130
Fourteens:	14, 28, 42 _____	140
Fifteens:	15, 30, 45 _____	150
Sixteens:	16, 32, 48 _____	160
Seventeens:	17, 34, 51 _____	170
Eighteens:	18, 36, 54 _____	180
Nineteens:	19, 38, 57 _____	190
Twenties:	20, 40, 60 _____	200

* Rule Of Order 1

- Sometimes sums have more than one thing to do in them.
The rule of order states that you must do \times **and** \div **before** $+$ **and** $-$.
Look at these two examples:

Example $6 + 3 \times 4$

You do the \times first, i.e. $3 \times 4 = 12$

So $6 + 3 \times 4 = 6 + 12$

$6 + 12 = 18$

Example $10 - 16 \div 4$

You do the \div first, i.e. $16 \div 4 = 4$

So $10 - 16 \div 4 = 10 - 4$

$10 - 4 = 6$

* TASK A Re-write these sums and then solve them.

a. $4 \times 2 + 7 = \boxed{8} + \boxed{7} = \square$

i. $4 \div 2 + 6 = \boxed{2} + \boxed{6} = \square$

b. $2 \times 3 + 2 = \square + \square = \square$

j. $6 \div 3 + 5 = \square + \square = \square$

c. $5 \times 6 + 3 = \square + \square = \square$

k. $10 \div 5 - 2 = \square - \square = \square$

d. $8 \times 2 + 5 = \square + \square = \square$

l. $12 - 9 \div 3 = \boxed{12} - \boxed{3} = \square$

e. $3 + 2 \times 6 = \boxed{3} + \boxed{12} = \square$

m. $20 - 24 \div 6 = \square - \square = \square$

f. $4 + 3 \times 5 = \square + \square = \square$

n. $15 + 18 \div 3 = \square + \square = \square$

g. $8 + 4 \times 9 = \square + \square = \square$

o. $21 - 12 \div 4 = \square + \square = \square$

h. $9 - 2 \times 4 = \square - \square = \square$

p. $36 \div 9 + 3 = \square + \square = \square$

* Addition: Regrouping 3

Example



Look at the following sum: $565 + 359$.

	1		
5	6	5	
+	3	5	9
			4

Step 1: Add the Ones

$$5 + 9 = 14$$

The 4 is placed in the Ones column and the 1 is regrouped to the Tens.

	1	1	
5	6	5	
+	3	5	9
		2	4

Step 2: Add the Tens

$$1 + 6 + 5 = 12$$

The 2 is placed in the Tens column and the 1 is regrouped to the Hundreds.

	1		1	
5	6	5		
+	3	5	9	
	9	2	4	

Step 3: Add the Hundreds

$$1 + 5 + 3 = 9$$

*** TASK A** Try these.

	4	6	4
4	5	9	
+	4	5	9

	2	5	7
4	4	7	
+	4	4	7

	7	7	6
1	3	5	
+	1	3	5

*** TASK B** Now try without the grid.

$$\begin{array}{r} 668 \\ + 252 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 346 \\ + 576 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 254 \\ + 649 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 656 \\ + 177 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 674 \\ + 266 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 588 \\ + 134 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 463 \\ + 277 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 462 \\ + 359 \\ \hline \\ \hline \end{array}$$

* Subtraction: Regrouping 1

Example Look at the following sum, **964** – **636**.

$$\begin{array}{r} 964 \\ - 636 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \overset{5}{\cancel{6}} \overset{1}{4} \\ - 636 \\ \hline 8 \end{array}$$

Step 1: Take away the Ones. 4 – 6 can't be done so regroup from the Tens.

Step 2: The 4 becomes 14 and the 6 becomes 5. 14 – 6 = 8

$$\begin{array}{r} 9 \overset{5}{\cancel{6}} \overset{1}{4} \\ - 6 \overset{3}{\cancel{3}} 6 \\ \hline 2 \quad 8 \end{array}$$

$$\begin{array}{r} 9 \overset{5}{\cancel{6}} \overset{1}{4} \\ - 6 \overset{3}{\cancel{3}} 6 \\ \hline 3 \quad 2 \quad 8 \end{array}$$

Step 3: Take away the Tens
5 – 3 = 2

Step 4: Take away the Hundreds
9 – 6 = 3

- Remember to work from right to left.

* TASK A Try these.

$$\begin{array}{r} 562 \\ - 454 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 953 \\ - 436 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 852 \\ - 635 \\ \hline \\ \hline \end{array}$$

* TASK B Now try without the grid.

$$\begin{array}{r} 46 \\ - 28 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 64 \\ - 47 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 865 \\ - 729 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 851 \\ - 747 \\ \hline \\ \hline \end{array}$$

✳ Multiplication: Regrouping 2

Example To multiply 25×3

Tens	Ones
2	5
×	3
1	5
+	6
6	0
7	5

Step 1:
 $5 \times 3 = 15$

Step 2:
Put down the zero.
 $2 \times 3 = 6$

Step 3:
 $15 + 60 = 75$

2	5
×	3
1	5
+	6
6	0
7	5

*** TASK A** Try these. Some parts have been done for you.

Tens	Ones
2	6
×	2
1	2
+	0

Tens	Ones
1	5
×	4
2	0
+	

Hundreds	Tens	Ones
	2	9
×		4
+		

*** TASK B** Try these.

36
× 2
+

18
× 4
+

17
× 5
+

18
× 2
+

26
× 4
+

19
× 4
+

16
× 9
+

28
× 2
+