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PRACTICE 1

Parts one and two

MULTIPLY 3-DIGIT NUMBERS

OBJECTIVES

In part one, students will:

- Use the standard algorithm to find products of 3-digit by 1-digit numbers and apply the algorithm to solve word problems.
- Use mental maths to find products.
- Evaluate examples to identify and correct errors.

In part two, students will:

- Use partial products to find products of 3-digit by 2-digit numbers.
- Use rounding to estimate products.
- Analyse their work to discover patterns and apply them to similar problems.

VOCABULARY

Part one

- **3-digit number:** a number with digits in the ones place, the tens place and the hundreds place
- **factor:** a number that is multiplied by another number
- **product:** the result of multiplication
- **regroup:** to trade place-value names for numbers, such as hundreds for tens or tens for hundreds and tens for ones or ones for tens; does not change the value

Part two

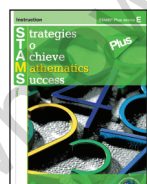
- **estimate:** to find an answer that is close to the exact answer by rounding or using compatible numbers
- **2-digit number:** a number with digits in the ones place and the tens place
- **partial product:** the result of multiplying one place value of a 2- or 3-digit number

AUSTRALIAN CURRICULUM CONTENT DESCRIPTIONS

See page 13 to cross-reference this lesson with aligned Australian Curriculum content descriptions

RELATED STAMS® PLUS INSTRUCTION

For instruction that supports this practice, see:



STAMS® Plus, Book E, Lesson 1,
Multiply 3-digit numbers,
pp. 4–13

STAMS® IWB lessons, Level E, Visualise
multiplying 3-digit numbers,
<http://iwb.camsandstams.com.au>



Use features such as clonable base-ten blocks to deepen students' understanding of multiplying 3-digit numbers.

Part one

PRACTICE
1
 Part one

MULTIPLY 3-DIGIT NUMBERS

Use multiplication to solve the problem.

1. A company buys 9 printers. Each printer costs \$287. How much does the company spend on printers?

	Hundreds	Tens	Ones	
	2	8	7	← regrouping
×	9			← factor
	18	63		← factor
	2	5	8	← product

Solution: The company spends \$2583 on printers.

total cost = cost of each printer × number of printers
 Find the **product**.
 Multiply the ones, tens and hundreds of 287 by 9. Regroup as needed.

Let's solve this together.

Solve each problem. Choose the best answer.

2. Kara makes \$248 each month. How much does Kara make in 6 months?

Ⓐ \$1248
 Ⓑ \$1288
 Ⓒ \$1434
 Ⓓ \$1488

3. Glenn drives 145 kilometres each week. How many kilometres does he drive in 8 weeks?

Ⓐ 820
 Ⓑ 933
 Ⓒ 1160
 Ⓓ 2460

4. A movie theatre has 391 seats. For 4 different shows, the theatre sells a ticket for every seat. What is the total number of tickets sold?

Ⓐ 1264
 Ⓑ 1564
 Ⓒ 1565
 Ⓓ 3664

5. Bob can type 105 words in a minute. How many words can he type in 7 minutes?

Ⓐ 705
 Ⓑ 712
 Ⓒ 735
 Ⓓ 753

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Multiply 3-digit numbers

MENTAL MATHS Answer the following questions to find the product.

$365 \times 8 = \square$

6. What is 300×8 ? 2400

7. What is 60×8 ? 480

8. What is 5×8 ? 40

9. What is the product 365×8 ? 2920

REASONING

Solve the problem. Explain your thinking.

10. There are 7 books in Martina's favourite book series. Each book is 318 pages long. Martina reads the entire series. Her friend Chris says Martina has read 2456 pages. Chris's work is shown below.

35
318
× 7
2456

Explain why Chris is incorrect. How many pages has Martina read?
 Chris multiplied 7 times the 5 regrouped tens instead of multiplying 7 times 1 ten and then adding the 5 regrouped tens. Martina has read

2226 pages.

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At a glance

Students solve a variety of problems involving multiplication of 3-digit by 1-digit numbers. If students have difficulty, check for the following common pitfalls and use the related tips to provide help.

Solve Problems 2–5

If If students choose D for problem 4, they may have incorrectly multiplied the regrouped hundreds by the product of the hundreds place because they do not understand the role of regrouping in multiplication.

Then Review regrouping. Clarify why regrouped amounts must be added to the product of the related place value. Regrouped amounts are partial products, not digits of the numbers being multiplied.

Mental Maths, Problems 6–9

If If students write an incorrect product for problem 9, they may have trouble visualising the partial products because they do not understand place value.

Then Review place value to the thousands. Provide students with base-ten blocks to model the mental maths.

Reasoning, Problem 10

If If students cannot explain why Chris's work is incorrect, they may have difficulty isolating the errors.

Then Have students solve the problem themselves, then compare their work to Chris's by checking the multiplication of each place value and the regrouping.

Part two

PRACTICE
1
 Part two

MULTIPLY 3-DIGIT NUMBERS

Use multiplication to solve the problem.

1. $529 \times 64 = \square$
 Remember: the product of a 3-digit number and a 2-digit number is the sum of **partial products**.

	Hundreds	Tens	Ones	
	1	5		← regrouping from multiplying by 6 tens
	1	3		← regrouping from multiplying by 4 ones
	5	2	9	← 3-digit number
×	6	4		← 2-digit number
	2	1	1	← partial product: 529×4 ones
+	3	1	7	← partial product: 529×6 tens
	3	3	8	← product is sum of partial products

Let's solve this together.

Solution: $529 \times 64 = 33856$

Solve each problem. Choose the best answer.

2. A music camp charges \$236 for one week. What is the cost of 15 weeks at the camp?

Ⓐ \$1416
 Ⓑ \$2360
 Ⓒ \$3410
 Ⓓ \$3540

3. Rina's softball has a mass of 149 grams. What would be the mass of 25 softballs identical to Rina's?

Ⓐ 1043 g
 Ⓑ 3385 g
 Ⓒ 3725 g
 Ⓓ 5025 g

MENTAL MATHS Round the factors and use estimation to check each product. Circle the word *correct* or *incorrect* for each problem.

4. a. $688 \times 19 = 13072$ correct incorrect
 b. $207 \times 93 = 2484$ correct incorrect
 c. $377 \times 28 = 8906$ correct incorrect

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Multiply 3-digit numbers

Answer numbers 5–7 to find the product.

$824 \times 37 = \square$

5. What is 824×77 5768

6. What is 824×30 ? 24720

7. What is 824×37 ? $5768 + 24720 = 30488$

REASONING

Solve each problem. Fill in the blanks.

8. Find the partial products and add them to find the product of 263 and 11.

	Hundreds	Tens	Ones		
	2	6	3		
×	1	1			
	2	6	3	← partial product: 263×1 one	
+	2	6	3	0	← partial product: 263×1 ten
	2	8	9	3	← product is sum of partial products

9. Study the problem above. Compare the number 263 to the product, 2893.

a. What is the thousands digit in the product? 2

b. What is the hundreds digit in the product? 8 It is the sum of 2 and 6.

c. What is the tens digit in the product? 9 It is the sum of 6 and 3.

d. What is the ones digit in the product? 3

e. Look for a number pattern. How are the digits in the product related to the digits in the number being multiplied by 11? The first digit of the product is the same as the first digit of the number being multiplied; the second digit of the product is the sum of the first two digits of the number being multiplied by 11; the third digit of the product is the sum of the last two digits of the number being multiplied by 11; the last digit of the product is the same as the last digit of the number being multiplied.

10. Consider the problem 427×11 . Fill in the digits of the product using the number pattern you found. 4 6 9 7

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At a glance

Students solve a variety of problems involving multiplication of 3-digit by 2-digit numbers. If students have difficulty, check for these common pitfalls and use the related tips to provide help.

Solve Problems 2–3

If If students choose A for problem 2, they may have incorrectly recorded the partial product of 236×1 ten because they are losing track of place value.

Then Clarify that they are multiplying 236 by 1 ten, not 1 one. Remind students to write a zero in the partial product to indicate tens.

Mental Maths, Problem 4, a–c

If Students who choose *correct* for problem 4b may have incorrectly rounded the second factor up to the nearest 100.

Then Remind students to round each factor to its greatest place value when estimating the product.

Solve Problems 5–7

If If students write an incorrect product for problem 7, they may have failed to add the partial products because they do not fully understand the algorithm.

Then Clarify that each *partial* product is only *part* of the product; they must be combined.

Reasoning, Problems 8–10

If If students cannot apply the pattern from problem 9 to solve problem 10, they may not see the relationship between the two.

Then Give students the product with questions similar to 9 a–c to help them see that the same pattern applies because both 263 and 427 are multiplied by 11.

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OBJECTIVES

In review 1, students will:

- Multiply and divide whole numbers using the standard algorithm and mental maths.
- Use multiplication and related basic facts to estimate quotients.
- Solve word problems involving multiplication and division.
- Apply multiplication and use reasoning to solve a real-life word problem.

In review 2, students will:

- Estimate products and quotients.
- Solve word problems by finding estimated or exact products and quotients.
- Apply short division and use reasoning to solve mathematical and real-life problems.

VOCABULARY**Review 1**

- **estimate:** to find an answer that is close to the exact answer by rounding or using compatible numbers
- **quotient:** the result of division

Review 2

- **product:** the result of multiplication
- **short division:** an algorithm for division where each step is condensed

**AUSTRALIAN CURRICULUM
CONTENT DESCRIPTIONS**

See page 13 to cross-reference this lesson with aligned Australian Curriculum content descriptions

Review 1

REVIEW
1

REVIEW 1: PRACTICES 1–4

Multiply or divide to solve each problem. Show your work.

1.
$$\begin{array}{r} 33 \\ \times 198 \\ \hline 792 \end{array}$$

2.
$$\begin{array}{r} 11 \\ 23 \\ \times 24 \\ \hline 2232 \\ + 11160 \\ \hline 13392 \end{array}$$

3. $4800 \div 6 = \frac{\quad}{800}$
 $48 \div 6 = 8,$
 so $4800 \div 6 = 800$

4.
$$\begin{array}{r} 9 \overline{)252} \qquad \qquad 28 \\ \underline{9 \overline{)25}2} \\ \phantom{9 \overline{)25}2} 28 \\ \phantom{9 \overline{)25}2} \underline{28} \\ \phantom{9 \overline{)25}2} 0 \end{array}$$

5. Explain how you could use multiplication to estimate $843 \div 13$.
 What is the estimated quotient?
 840 is close to 843. 12 is close to 13.
 Think of the basic fact $12 \times 7 = 84$.
 Use the number sentence $12 \times 70 = 840$.
 So, $840 \div 12 = 70$.

Solution: $843 \div 13 \approx 70$.

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Review 1: Practices 1–4


Solve each problem. Choose the best answer.

6. A radio station gives away \$6000 to be shared equally by 50 people. Which basic fact could help you find the amount each person receives?
 A $12 \div 6 = 2$
 B $24 \div 6 = 4$
 C $30 \div 5 = 6$
 D $60 \div 5 = 12$

7. Tia makes sandwiches for 134 students on a school trip. She uses 3 slices of meat for each sandwich. How many meat slices does Tia use in all?
 A 137 C 392
 B 302 D 402

8. A memory card can hold 800 megabytes of data. Ella wants to store 4800 megabytes. How many memory cards will she need?
 A 4 C 60
 B 6 D 400

9. The T-Zone sells T-shirts for about \$8 each. About how many T-shirts does the shop sell if sales total \$2382?
 A 3 C 300
 B 30 D 3000



REASONING

Solve the problem. Explain your thinking.

10. During a contest, Jeanie earns 50 points for every book chapter she reads. For every 2500 points earned, she receives a voucher for a local book shop. If Jeanie reads 60 chapters, how many vouchers does she receive?
 Use pictures, words or numbers to show your work.

$50 \times 60 = 3000$ (points per chapter \times number of chapters)
 1 voucher for 2500 points and 2 vouchers for 2500×2 , or 5000 points

Solution: 1 voucher
 I figured out that Jeanie has 3000 points. This is more than enough points for 1 voucher (2500 points), but not enough points for 2 vouchers (5000 points).

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At a glance

Students solve a variety of multiplication and division problems involving whole numbers. If students have difficulty, check for the following common pitfalls and use the related tips to provide help.

Solve Problems 1–4

If If students write 2082 for problem 1, they may have added regrouped tens and hundreds before multiplying because they do not understand the multiplication algorithm.

Then Have students describe each step as they work several problems.

Solve Problem 5

If If students' estimate is 80, they may have used $10 \times 80 = 800$ because they rounded 843 down to 800 and 13 down to 10.

Then This is a legitimate estimate, but an underestimate. Ask students to think of another pair of compatible numbers that will give a closer estimate.

Solve Problems 6–9

If If students choose C for problem 8, they may have incorrectly simplified the division because they forgot that the dividend and divisor must be divided by the same number.

Then Have students write the problem as $\frac{4800 \div 100}{800 \div 100}$ to emphasise dividing by the same number.

Reasoning, Problem 10

If If students write 0 vouchers, they may have thought $60 \times 50 = 300$ because they did not pay attention to place value.

Then Have students write the zero place-holder in a different colour to highlight its use.