Maths Mastery
Multiplication and Division

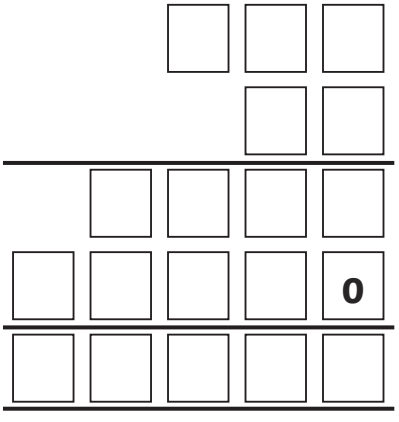
1. The Mad Hatter challenges you to use all four numbers: 4, 6, 6 and 8, but using each number only once, and find as many ways as you can to make 24 by adding, subtracting, multiplying and dividing.

   He says there are over 60 different ways of getting the answer! Is he mad?

   With a partner find out as many of the different ways to make 24 as you can.

2. Using the numbers 1, 2, 3, 4 and 5 once and only once, and the operations × and ÷ once and only once, what is the smallest whole number you can make?

3. The White Rabbit has a puzzle. A three-digit number is multiplied by a two-digit number and the calculation is written out. Each box stands for one digit. Apart from the zero shown, the only digits which occur are 2, 3, 5 and 7. What are the missing numbers?



4. Choose two digits and arrange them to make 2 two-digit numbers, for example:

   If you choose 1 and 2, you can make 12 and 21.

   Now add your two-digit numbers together. Now add your single-digit numbers together. Divide your two-digit answer by your single-digit answer. Try this again using 2 different digits. What happens? Can you explain it?

5. The twins can't decide which is true and which is false. Can you help?

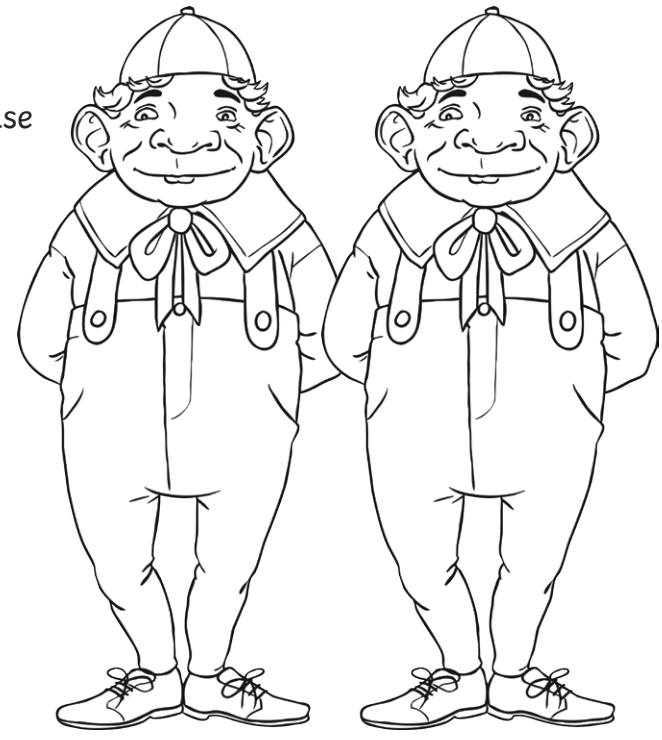
   7 x 6 = 7 x 3 x 2 _____

   7 x 6 = 7 x 3 + 3 _____

   8 x 2 = 8 x 3 − 8 _____

   9 x 4 = 6 x 6 _____

   Now find some of your own true and false multiplication statements.



6. The Cheshire Cat says that 8 x 4 can be shown in three different ways.

   Is he right? Prove it.

   $8 \times 3 + \square = \square$

   $8 \times 5 - \square = \square$

   $8 \times 4 = \square \times \square = \square \times \square$

7. What is the next number in the sequence? Explain your answer.

   3, 7, 19, 55, _____

   Now make up your own 'what comes next in the sequence' set of numbers.

8. Caterpillar has been thinking about some numbers.

   He divided a whole number by another whole number and got 3.125. Now he has forgotten what the two whole numbers were in the first place. Can you help him work them out?

Maths Mastery
Multiplication and Division **Answers**

1. The Mad Hatter challenges you to use all four numbers: 4, 6, 6 and 8, but using each number only once, and find as many ways as you can to make 24 by adding, subtracting, multiplying and dividing.

   He says there are over 60 different ways of getting the answer! Is he mad?

   With a partner find out as many of the different ways to make 24 as you can.

1. (4 - 6 ÷ 6) × 8	**8. 8 × 6 - 6 × 4**	**15. 8 + 4 + 6 + 6**	**22. 6 × 6 - 8 - 4**
2. 8 × (4 - 6 ÷ 6)	**9. 8 × 6 - 4 × 6**	**16. 8 + 6 + 4 + 6**	**23. 6 × 6 - (4 + 8)**
3. (6 + 6) × 8 ÷ 4	**10. 4 + 6 + 6 + 8**	**17. 6 + 8 + 4 + 6**	**24. (6 - 8 ÷ 4) × 6**
4. 8 ÷ 4 × (6 + 6)	**11. 4 + 8 + 6 + 6**	**18. 6 + 4 + 8 + 6**	**25. 6 × (6 - 8 ÷ 4)**
5. (6 + 6) ÷ 4 × 8	**12. 4 + 6 + 8 + 6**	**19. 8 + 6 + 6 + 4**	**26. 8[6 ÷ (6 - 4)]**
6. 6 × 8 - 6 × 4	**13. 6 + 6 + 4 + 8**	**20. 6 × 6 - (8 + 4)**	**27. [6 ÷ (6 - 4)] × 8**
7. 6 × 8 - 4 × 6	**14. 6 + 6 + 8 + 4**	**21. 6 × 6 - 4 - 8**	

2. Using the numbers 1, 2, 3, 4 and 5 once and only once, and the operations × and ÷ once and only once, what is the smallest whole number you can make?

   13 × 4 ÷ 52 = 1

3. The White Rabbit has a puzzle. A three-digit number is multiplied by a two-digit number and the calculation is written out. Each box stands for one digit. Apart from the zero shown, the only digits which occur are 2, 3, 5 and 7. What are the missing numbers?

		7	**7**	**5**
		×	**3**	**3**
	2	**3**	**2**	**5**
2	**3**	**2**	**5**	**0**
2	**5**	**5**	**7**	**5**

4. Choose two digits and arrange them to make 2 two-digit numbers, for example:

   If you choose 1 and 2, you can make 12 and 21.

   Now add your two-digit numbers together. Now add your single-digit numbers together. Divide your two-digit answer by your single-digit answer. Try this again using 2 different digits. What happens? Can you explain it?

   Generally, the sum of our two digit numbers will be:

   (10x + y) + (10y + x)=11x + 11y and this sum divided by x + y will be 11.

5. The twins can't decide which is true and which is false. Can you help?

   7 x 6 = 7 x 3 x 2 **True**
   7 x 6 = 7 x 3 + 3 **False**
   8 x 2 = 8 x 3 − 8 **True**
   9 x 4 = 6 x 6 **True**

6. The Cheshire Cat says that 8 x 4 can be shown in three different ways.

   Is he right? Prove it.

   8 × 3 + **8** = **32**

   8 × 5 − **8** = **32**

   8 × 4 = **16** × **2** = **32** × **1**

7. What is the next number in the sequence? Explain your answer.

   3, 7, 19, 55, **163**

   The difference between each number is:
   4, 12, 36, 108.
   3 x 4 = 12
   3 x 12 = 36
   3 x 36 = 108

8. Caterpillar has been thinking about some numbers.

   He divided a whole number by another whole number and got 3.125. Now he has forgotten what the two whole numbers were in the first place. Can you help him work them out?

   The numbers are 25 and 8.

   Use a calculator to divide numbers less than 50 in a systematic way, starting with 50 ÷ 15 until you reach 25 ÷ 8.