

**Age 11+ Level ★  
Worksheet 1 - Solutions****1. No Matter**

My answer will always be a multiple of 7

[rich.maths.org/2532/solution](http://rich.maths.org/2532/solution)

**2. Nine in a Line**

The largest number is 227

[rich.maths.org/5752/solution](http://rich.maths.org/5752/solution)

**3. Adding and Multiplying**

The answer would have been 3165

[rich.maths.org/12817/solution](http://rich.maths.org/12817/solution)

**4. Cube Pile**

A tower of all five cubes would be 50 cm tall

[rich.maths.org/11712/solution](http://rich.maths.org/11712/solution)

**5. 8 in a Row**

The largest is 11

[rich.maths.org/12613/solution](http://rich.maths.org/12613/solution)

**6. Paul's Children**

His sons' ages add up to 12

[rich.maths.org/11639/solution](http://rich.maths.org/11639/solution)

*These problems are adapted from UKMT ([ukmt.org.uk](http://ukmt.org.uk)) and SEAMC ([seamc.asia](http://seamc.asia)) problems.*

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Worksheet 1 - Solutions****1. Standing on the Table**

The table is 90 cm tall

[rich.maths.org/11717/solution](http://rich.maths.org/11717/solution)

**2. Square Total**

The smallest positive integer is 5

[rich.maths.org/11703/solution](http://rich.maths.org/11703/solution)

**3. Adding in Pairs**

The numbers are 18, 21 and 30, so the largest is 30

[rich.maths.org/13384/solution](http://rich.maths.org/13384/solution)

**4. Multiple Magic**

Your answer will always be a multiple of 3

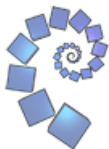
[rich.maths.org/6260/solution](http://rich.maths.org/6260/solution)

**5. Building Up**

$x = 360$

[rich.maths.org/10164/solution](http://rich.maths.org/10164/solution)

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**Age 14+ Level ★★  
Worksheet 1 - Solutions****1. Divisible Expression**

$$(1 + x + y)^2 - (1 - x - y)^2 = 4x + 4y = 4(x + y)$$

which is divisible by 4

[rich.maths.org/6738/solution](http://rich.maths.org/6738/solution)

**2. Little Difference**

$$(x - 1)(x + 1) - x^2 = x^2 - 1 - x^2 = -1$$

$$\text{so } 2015 \times 2017 - 2016^2 = -1$$

$$\text{and } 2016 \times 2018 - 2017^2 = -1$$

[rich.maths.org/10126/solution](http://rich.maths.org/10126/solution)

**3. Brian's Number**

The largest integer he could have chosen is 21

[rich.maths.org/12570/solution](http://rich.maths.org/12570/solution)

**4. Adding to 400**

The four integers are 192, 96, 64 and 48

[rich.maths.org/11678/solution](http://rich.maths.org/11678/solution)

**5. Order the Products**

In order of size, from smallest to largest:

$$186 \times 214 \quad 210 \times 190 \quad 195 \times 205 \quad 198 \times 202 \quad 200 \times 200$$

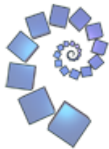
[rich.maths.org/13573/solution](http://rich.maths.org/13573/solution)

**6. Square and Cube**

The number is

[rich.maths.org/10120/solution](http://rich.maths.org/10120/solution)

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**Worksheet 2 - Solutions**

**1. Cuboid Perimeters**

The volume of the cuboid is  $35 \text{ cm}^3$

[rich.maths.org/12780/solution](http://rich.maths.org/12780/solution)

**2. Relative Powers**

The number is  $-3$

[rich.maths.org/5017/solution](http://rich.maths.org/5017/solution)

**3. Clever Calculation**

$$x^2 - (x - 2)(x + 2) = x^2 - x^2 + 4 = 4$$

$$\text{so } 2017^2 - 2015 \times 2019 = 4$$

[rich.maths.org/13223/solution](http://rich.maths.org/13223/solution)

**4. Big Fibonacci**

The maximum possible value of the first term is 999

[rich.maths.org/9395/solution](http://rich.maths.org/9395/solution)

**5. Granny's Age**

Our ages add up to 100

[rich.maths.org/10158/solution](http://rich.maths.org/10158/solution)

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**Worksheet 1 - Solutions**

**1. Choir Boys**

The choir has 99 members this year

[rich.maths.org/12604/solution](http://rich.maths.org/12604/solution)

**2. Stolen Pension**

The pensioner had £2057 before the theft

[rich.maths.org/13219/solution](http://rich.maths.org/13219/solution)

**3. Find the Factor**

The smaller factor is 63

[rich.maths.org/13753/solution](http://rich.maths.org/13753/solution)

**4. Third Side**

The three possible Pythagorean triples are:

7, 24, 25

21, 20, 29

35, 12, 37

so the three possible lengths for the third side are 7, 21 and 35

[rich.maths.org/12809/solution](http://rich.maths.org/12809/solution)

**5. Months and Years**

Mary was 12 years old on her last birthday

[rich.maths.org/8678/solution](http://rich.maths.org/8678/solution)

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