



**Age 11+ Level ★**  
**Worksheet 1 - Solutions**

**1. Street Lamps**

81 seconds

[rich.maths.org/5015/solution](http://rich.maths.org/5015/solution)

**2. Printing Error**

133 is printed on the last page

[rich.maths.org/7165/solution](http://rich.maths.org/7165/solution)

**3. Expanding Pattern**

92 small shaded squares

[rich.maths.org/6800/solution](http://rich.maths.org/6800/solution)

**4. Fruit Line-up**

Need at least 8 fruit

[rich.maths.org/7155/solution](http://rich.maths.org/7155/solution)

**5. Many Matildas**

The 1000<sup>th</sup> letter is d

[rich.maths.org/7174/solution](http://rich.maths.org/7174/solution)

*These problems are adapted from UKMT ([ukmt.org.uk](http://ukmt.org.uk)) and WMC ([competition.ac](http://competition.ac)) problems.*



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**Worksheet 2 – Solutions**

**1. Suit Sequence**

The 100<sup>th</sup> and 101<sup>st</sup> symbols are  $\diamond$  and  $\heartsuit$

[rich.maths.org/11683/solution](http://rich.maths.org/11683/solution)

**2. What a Coincidence**

The next number to appear in both sequences is 2068

[rich.maths.org/9431/solution](http://rich.maths.org/9431/solution)

**3. Triangular Clock**

She put the number 5 where the 6 would usually go

[rich.maths.org/5684/solution](http://rich.maths.org/5684/solution)

**4. Fibonacci Deduction**

The seventh number in the sequence is 24

[rich.maths.org/7147/solution](http://rich.maths.org/7147/solution)

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**Worksheet 1 - Solutions**

**1. Sliding Robot**

After 2011 slides the robot will be at 1006

[rich.maths.org/11640/solution](http://rich.maths.org/11640/solution)

**2. Knockdown**

Peg 32 will be the last one to be knocked down

[rich.maths.org/11677/solution](http://rich.maths.org/11677/solution)

**3. Square Grid**

$\frac{5050}{10000} = \frac{101}{200}$  of the whole square is shaded

[rich.maths.org/13185/solution](http://rich.maths.org/13185/solution)

**4. Tiled Floor**

There are 3025 tiles altogether

[rich.maths.org/13421/solution](http://rich.maths.org/13421/solution)

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**Worksheet 2 - Solutions**

**1. How many Rectangles?**

The greatest possible number is 42

[rich.maths.org/11658/solution](http://rich.maths.org/11658/solution)

**2. Hexagon Line**

250 hexagons are required

[rich.maths.org/11611/solution](http://rich.maths.org/11611/solution)

**3. Pattern Snake**

The piece between 2007 and 2011 looks like E:



[rich.maths.org/6792/solution](http://rich.maths.org/6792/solution)

**4. Night Watchmen**

Their watches will agree at 12 noon (assuming 12 hour analogue watches), when they will both say 6 o'clock

24 hour watches won't agree again until midnight tomorrow, when they will both say midday

[rich.maths.org/5768/solution](http://rich.maths.org/5768/solution)

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**Age 14+ Level ★★**  
**Worksheet 1 - Solutions**

**1. Diagonals**

A regular icosagon has 170 diagonals

[rich.maths.org/12928/solution](http://rich.maths.org/12928/solution)

**2. Difference Sequence**

The 28<sup>th</sup> term

[rich.maths.org/13157/solution](http://rich.maths.org/13157/solution)

**3. Trolley Park**

Each trolley is 1.1m long

[rich.maths.org/11624/solution](http://rich.maths.org/11624/solution)

**4. Newspaper Sheets**

There are 17 sheets altogether (68 pages)

[rich.maths.org/7180/solution](http://rich.maths.org/7180/solution)

**5. Alternating Sum**

$n = 4015$

[rich.maths.org/5707/solution](http://rich.maths.org/5707/solution)

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**Age 14+ Level ★★**  
**Worksheet 2 – Solutions**

**1. 12345**

The sum of all 2000 digits is 6000

[rich.maths.org/2344/solution](http://rich.maths.org/2344/solution)

**2. Below 400**

The number directly below 400 will be 440

[rich.maths.org/5002/solution](http://rich.maths.org/5002/solution)

**3. Collatz 13**

The value of  $t_{2008} = 1$

[rich.maths.org/9433/solution](http://rich.maths.org/9433/solution)

**4. Collatz-ish**

The  $n$ th term is equal to  $n$  when  $n$  equals 13 and 16

[rich.maths.org/10131/solution](http://rich.maths.org/10131/solution)

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