**Special Date Magic Square – Worked example: date 06/04/2018**

|  |  |  |  |
| --- | --- | --- | --- |
| a  **6** | b  **4** | c  **20** | d  **18** |
| e | f | g | h |
| i | j | k | L |
| m | n | o | P |

1. Place the special date in the first row

Date is 6/4/2018 so **a=6, b=4, c=20, d=18**

1. Choose m & p so that: b + c = m + p

(there are many different possible values)

b+c=4+20=24 🡪 I choose **m=11, p=13**

(check: 11+13=24)

1. Choose g & j so that: a + p = g + j

(there are many different possible values)

a+p=6+13=19 🡪 I choose **g=10, j=9** (check: 10+9=19)

1. Choose f & k so that: m + d = f + k (there are many different possible values)

m+d=11+18=29 🡪I choose **f=17, k=12** (check: 17+12=29)

1. Choose n so that: b + n = g + k

b+n=g+k 🡪 4+n=10+12=22 🡪 n=22-4=18 (check: 4+18=22) so **n=18**

1. Choose o so that: c + o = f + j

c+o=f+j 🡪 20+o=17+9= 26 🡪 o=26-20=6 (check: 20+6=26) so **o=6**

1. Choose h & l so that: a + m = h + l (there are many different possible values)

a+m=6+11=17 🡪 I choose **h=3, l=14** (check: 3+14=17)

1. All rows, columns and diagonals must add up to the same total – use this to work out e & i

a+b+c+d=6+4+20+18=48 🡪 so the total for each row, column and diagonal is **48**

e+f+g+h=48 🡪 e+17+10+3=e+30=48 🡪 e=48-30=18 (check: 30+18=48) so **e=18**

i+j+k+l=48 🡪 i+9+12+14=i+35=48 🡪 i=48-35=13 (check: 13+35=48) so **i=13**

|  |  |  |  |
| --- | --- | --- | --- |
| a  **6** | b  **4** | c  **20** | d  **18** |
| e  **18** | f  **17** | g  **10** | h  **3** |
| i  **13** | j  **9** | k  **12** | l  **14** |
| m  **11** | n  **18** | o  **6** | p  **13** |

**Check it all works:**

Row 1 was chosen, gave the total 48;

Row 2 has just been checked to calculate e;

Row 3 has just been checked to calculate i;

Row 4: m+n+o+p=11+18+6+13=48;

Column 1: a+e+i+m=6+18+13+11=48;

Column 2: b+f+j+n=4+17+9+18=48;

Column 3: c+g+k+o=20+10+12+6=48;

Column 4: d+h+l+p=18+3+14+13=48;

Leading diagonal: a+f+k+p=6+17+12+13=48;

Backwards diagonal: d+g+j+m=18+10+9+11=48.

Puzzle taken from: <http://nrich.maths.org/1380>