normal is ***dead***

Sicherman Pair

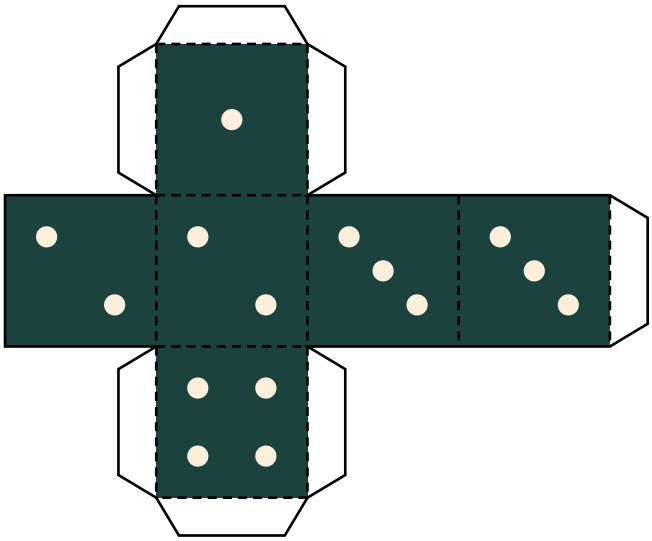
COMPONENT SHEET

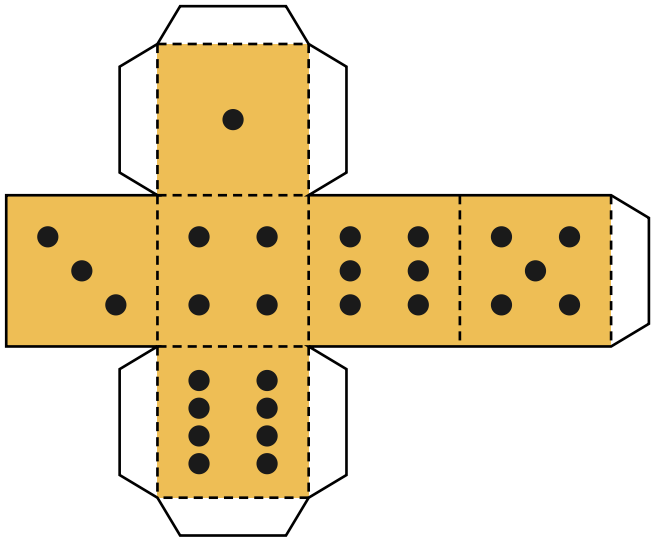
CONTENTS

1. Die, moss, 1.
2. Die, mustard, 1.
3. Rule slip, 1.

Cut ------ Fold

50 mm. Print at 100%.





ASSEMBLY

1. Print this sheet at 100%. Check the 50 mm bar with a ruler.
2. Cut along the solid lines.
3. Fold along the dashed lines, printed side out.
4. Glue each tab inside, under the face it meets. Close the last face last.
5. Opposite faces add to 5 on the moss die and 9 on the mustard die.

RULE SLIP

1. Roll both dice. Add the two numbers.
2. Use the total wherever the rules read the total.
3. Neither die is a standard die. Use them only as a pair.

Odds of every total: sheet 2.

Fig. 1. Doubles: 4 in 36. Standard pair: 6 in 36.

Sicherman Pair PROOF

ALL 36 OUTCOMES, PRINTED PAIR. MOSS DIE DOWN, MUSTARD DIE ACROSS.

	1	3	4	5	6	8
1	2	4	5	6	7	9
2	3	5	6	7	8	10
2	3	5	6	7	8	10
3	4	6	7	8	9	11
3	4	6	7	8	9	11
4	5	7	8	9	10	12

ALL 36 OUTCOMES, STANDARD PAIR. FIRST DIE DOWN, SECOND DIE ACROSS.

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Total	Ways, standard	Ways, printed	Expected in 1,000,000	Standard, rolled	Printed, rolled
2	1	1	27,777.8	27,764	27,720
3	2	2	55,555.6	55,510	55,471
4	3	3	83,333.3	83,644	83,180
5	4	4	111,111.1	111,438	110,952
6	5	5	138,888.9	139,150	139,402
7	6	6	166,666.7	166,223	166,723
8	5	5	138,888.9	138,668	138,464
9	4	4	111,111.1	110,968	110,775
10	3	3	83,333.3	83,648	83,723
11	2	2	55,555.6	55,266	55,774
12	1	1	27,777.8	27,721	27,816
All	36	36	1,000,000.0	1,000,000	1,000,000

Seed 3855941746. 1,000,000 virtual rolls of each pair.

Standard pair: drift 0.00121, chi-square 7.2.

Printed pair: drift 0.00122, chi-square 7.7.

An exact pair at 1,000,000 rolls: chi-square median 9.3, 95th percentile 18.3 (10 degrees of freedom). Above 18.3 about 1 time in 20.

Drift: the share of rolls that would have to land on a different total for the counts to match the exact odds. Zero is perfect.
Chi-square: the usual lumpiness score. Larger is lumpier.

$(x + 2x^2 + 2x^3 + x^4)(x + x^3 + x^4 + x^5 + x^6 + x^8) = (x + x^2 + x^3 + x^4 + x^5 + x^6)^2$

Of all pairs of six-sided dice numbered with positive whole numbers, exactly two give these totals: the standard pair and this one.