[1 One Run / No Sets 16 2](#_Toc70890446)

[1.1 All Same suit 16 2](#_Toc70890447)

[2 Two Runs / No Sets 2490 3](#_Toc70890448)

[2.1 All same suit 120 3](#_Toc70890449)

[2.2 Two suits 2370 3](#_Toc70890450)

[3 Three Runs 23472 3](#_Toc70890451)

[3.1 All same suit 48 3](#_Toc70890452)

[3.2 Two suits 8904 4](#_Toc70890453)

[3.3 Three suits 14520 4](#_Toc70890454)

[3.3.1 R4/R3/R3 14520 4](#_Toc70890455)

[4 3 Sets 13728 4](#_Toc70890456)

[4.1 S4/S3/S3 13728 4](#_Toc70890457)

[5 1 Run / 1 Set 1180 4](#_Toc70890458)

[5.1 Set does not include run suit 168 4](#_Toc70890459)

[5.1.1 No Overlap 4](#_Toc70890460)

[5.1.1.1 R7/S3 168 4](#_Toc70890461)

[5.2 Set does include run suit 1012 5](#_Toc70890462)

[5.2.1 No Overlap 528 5](#_Toc70890463)

[5.2.1.1 R6/S4 168 5](#_Toc70890464)

[5.2.1.2 R7/S3 360 5](#_Toc70890465)

[5.2.2 Overlap 484 5](#_Toc70890466)

[5.2.2.1 R7/S4 196 5](#_Toc70890467)

[5.2.2.2 R8/S3 288 5](#_Toc70890468)

[6 2 Runs / 1 Set 52728 5](#_Toc70890469)

[6.1 Runs are same suit–suit is in set 4476 5](#_Toc70890470)

[6.1.1 No overlap 1860 5](#_Toc70890471)

[6.1.1.1 R3/R3/S4 420 5](#_Toc70890472)

[6.1.1.2 R4/R3/S3 1440 6](#_Toc70890473)

[6.1.2 Overlap 2616 6](#_Toc70890474)

[6.1.2.1 R4/R3/S4 1176 6](#_Toc70890475)

[6.1.2.2 R4/R4/S3 720 6](#_Toc70890476)

[6.1.2.3 R5/R3/S3 720 6](#_Toc70890477)

[6.2 Runs are same suit–suit is not in set 1008 6](#_Toc70890478)

[6.2.1.1 R4/R3/S3 1008 6](#_Toc70890479)

[6.3 Runs are different suits–both in set 28716 6](#_Toc70890480)

[6.3.1 No Overlap 16320 6](#_Toc70890481)

[6.3.1.1 R3/R3/S4 3840 6](#_Toc70890482)

[6.3.1.2 R4/R3/S3 12480 7](#_Toc70890483)

[6.3.2 One Overlap 10488 7](#_Toc70890484)

[6.3.2.1 R4/R3/S4 (overlap on R4) 3120 7](#_Toc70890485)

[6.3.2.2 R4/R3/S4 (overlap on R3) 2040 8](#_Toc70890486)

[6.3.2.3 R4/R4/S3 2448 8](#_Toc70890487)

[6.3.2.4 R5/R3/S3 2880 8](#_Toc70890488)

[6.3.3 Two Overlaps 1908 9](#_Toc70890489)

[6.3.3.1 R4/R4/S4 612 9](#_Toc70890490)

[6.3.3.2 R5/R3/S4 576 9](#_Toc70890491)

[6.3.3.3 R5/R4/S3 720 9](#_Toc70890492)

[6.4 Runs are different suits–one in set 18528 10](#_Toc70890493)

[6.4.1 No Overlap 15144 10](#_Toc70890494)

[6.4.1.1 R4/R3/S3 15144 10](#_Toc70890495)

[6.4.2 One Overlap 3384 11](#_Toc70890496)

[6.4.2.1 R4/R4/S3 1584 11](#_Toc70890497)

[6.4.2.2 R5/R3/S3 1800 11](#_Toc70890498)

[7 1 Run / 2 Sets 42576 12](#_Toc70890499)

[7.1 Run suit in neither set 1440 12](#_Toc70890500)

[7.1.1 R4/S3/S3 1440 12](#_Toc70890501)

[7.2 Run suit in one set 11592 12](#_Toc70890502)

[7.2.1 No Overlap 10152 12](#_Toc70890503)

[7.2.1.1 R3/S4/S3 3240 12](#_Toc70890504)

[7.2.1.2 R4/S3/S3 6912 12](#_Toc70890505)

[7.2.2 One Overlap 1440 13](#_Toc70890506)

[7.2.2.1 R4/S4/S3 (overlaps S4) 1440 13](#_Toc70890507)

[7.3 Run suit in both sets 29544 13](#_Toc70890508)

[7.3.1 No Overlap 17856 13](#_Toc70890509)

[7.3.1.1 R3/S4/S3 7776 13](#_Toc70890510)

[7.3.2 One Overlap 10296 14](#_Toc70890511)

[7.3.2.1 R3/S4/S4 1080 14](#_Toc70890512)

[7.3.2.2 R4/S4/S3 (overlaps S4) 3456 14](#_Toc70890513)

[7.3.2.3 R4/S4/S3 (overlaps S3) 1728 14](#_Toc70890514)

[7.3.2.4 R5/S3/S3 4032 14](#_Toc70890515)

[7.3.3 Two Overlaps 1392 14](#_Toc70890516)

[7.3.3.1 R4/S4/S4 240 14](#_Toc70890517)

[7.3.3.2 R5/S4/S3 864 15](#_Toc70890518)

[7.3.3.3 R6/S3/S3 288 15](#_Toc70890519)

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[9.3 Common Scenarios 16](#_Toc70890524)

[9.3.1 A row with a single run of length n 14-n 16](#_Toc70890525)

[9.3.2 A row with two runs of lengths n and m (3,3): 28, (3,4): 21, (3,7): 6 16](#_Toc70890526)

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[9.3.5 A row of one run of length n + 1 set + space 6:21, 5:28, 4:36, 3:45 16](#_Toc70890529)

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[9.3.7 A row of two runs of lengths 3 and 4 + 1 set of 3 (outside runs) 35 16](#_Toc70890531)

[9.3.8 A row of two runs of lengths 3 and 4 + 1 set of 3 (inside runs) 56 16](#_Toc70890532)

[9.3.9 A row of two runs of lengths 3 + 1 set of 4 (outside runs) 35 16](#_Toc70890533)

[9.3.10 A row of two runs of lengths 3 + 1 set of 4 (inside runs) 35 16](#_Toc70890534)

# One Run / No Sets 16

## All Same suit 16

4 run starts x 4 suits

# Two Runs / No Sets 2490

## All same suit 120

2 orders x 6 run starts x 4 suits = 48

2 orders x 6 run starts x 4 suits = 48

6 run starts x 4 suits = 24

## Two suits 2370

(7 x 11 run starts) x (4 x 3 suits) = 924

(8 x 10 run starts) x (4 x 3 suits) = 960

( 9 x 9 run starts) x ( 4 x 3 / 2 suits) = 486

# Three Runs 23472

## All same suit 48

3 orders x 4 run starts x 4 suits = 48

## Two suits 8904

2 orders x (21 x 11 run starts) x (4x3 suits) = 5544

(28 x 10 run starts) x (4x3 suits) = 3360

## Three suits 14520

### R4/R3/R3 14520

(10 x 11 x 11 run starts) x (4 x 3 x 2 / 2 suits) = 14520

# 3 Sets 13728

## S4/S3/S3 13728

11 positions (j) for first set

(12-j) positions (k) for second

(13-j-k) positions for third set

3 orders x 286 run starts x (4x4 suit) = 13728

# 1 Run / 1 Set 1180

## Set does not include run suit 168

### No Overlap

#### R7/S3 168

42 run starts x 4 suits = 168

7 starting positions for run

6 possible ranks for set

## Set does include run suit 1012

### No Overlap 528

#### R6/S4 168

2 orders x 21 run starts x 4 suits = 168

#### R7/S3 360

2 orders x 15 run starts x (4x3 suits) = 360

### Overlap 484

#### R7/S4 196

7 starting positions for run

7 possible ranks for set

49 run starts x 4 suits = 196

#### R8/S3 288

6 starting positions for run

4 possible ranks for set

24 run starts x (4x3 suits) = 288

# 2 Runs / 1 Set 52728

## Runs are same suit–suit is in set 4476

### No overlap 1860

#### R3/R3/S4 420

3 orders x 35 run starts x 4 suits = 420

#### R4/R3/S3 1440

6 orders x 20 run starts x (4x3 suits) = 1440

### Overlap 2616

#### R4/R3/S4 1176

2 orders x 147 run starts x 4 suits = 1176

21 row run starts

7 possible ranks for set

#### R4/R4/S3 720

Rank of set must be end of one of the runs (4 possible ranks)

4 ranks x 15 run starts x (4x3 suits) = 720

#### R5/R3/S3 720

Rank of set must be end of the run of 5 (2 possible ranks)

2 ranks x 2 orders x 15 run starts x (4x3 suits) = 720

## Runs are same suit–suit is not in set 1008

#### R4/R3/S3 1008

2 orders x 21 run starts x 6 ranks x 4 suits = 1008

## Runs are different suits–both in set 28716

### No Overlap 16320

#### R3/R3/S4 3840

9 possible ranks (j) for set

j possible starts for each run

2 orders x 285 config x (4x3/2 suits) = 3420

5 possible ranks (j) for set

j possible starts for 1st run

6-j possible starts for 2nd run

35 config x (4x3 suits) = 420

#### R4/R3/S3 12480

8 possible ranks (j) for set

j possible starts for run of 4

j+1 possible starts for run of 3

2 orders x 240 config x (4x3x2 suits) = 11520

4 possible ranks (j) for set

j possible starts for 1st run

5-j possible starts for 2nd run

2 orders x 20 config x (4x3x2 suits) = 960

### One Overlap 10488

#### R4/R3/S4 (overlap on R4) 3120

9 possible starts (j) for run of 4

j possible starts for run of 3

2 orders x 45 run starts x (4x3 suits) = 1080

2 orders x 36 run starts x (4x3 suits) = 864

2 orders x 28 run starts x (4x3 suits) = 672

2 orders x 21 run starts x (4x3 suits) = 504

#### R4/R3/S4 (overlap on R3) 2040

8 possible starts (j) for run of 3

j possible starts for run of 4

2 orders x 36 run starts x (4x3 suits) = 864

2 orders x 28 run starts x (4x3 suits) = 672

2 orders x 21 run starts x (4x3 suits) = 504

#### R4/R4/S3 2448

2 orders x 36 run starts x (4x3x2 suits) = 1728

2 orders x 15 run starts x (4x3x2 suits) = 720

#### R5/R3/S3 2880

2 orders x 45 run starts x (4x3x2 suits) = 2160

2 orders x 15 run starts x (4x3x2 suits) = 720

### Two Overlaps 1908

#### R4/R4/S4 612

2 orders x 10 set ranks x (4x3/2) suits = 120

2 orders x 9 set ranks x (4x3 suits) = 216

2 orders x 8 set ranks x (4x3 suits) = 192

2 orders x 7 set ranks x (4x3/2 suits) = 84

#### R5/R3/S4 576

2 orders x 9 set ranks x (4x3) suits = 216

2 orders x 8 set ranks x (4x3 suits) = 192

2 orders x 7 set ranks x (4x3 suits) = 168

#### R5/R4/S3 720

2 orders x 9 set ranks x (4x3x2 suits) = 432

2 orders x 6 set ranks x (4x3x2 suits) = 288

## Runs are different suits–one in set 18528

### No Overlap 15144

#### R4/R3/S3 15144

8 possible ranks (j) for set

j possible starts for run of 4

j+2 possible starts for fun of 3

2 orders x 276 config x (4x3 suits) = 6624

5 possible ranks (j) for set

j possible starts for run of 4

6-j possible starts for fun of 3

2 orders x 35 config x (4x3 suits) = 840

9 possible ranks (j) for set

j possible starts for run of 4

j possible starts for fun of 3

2 orders x 285 config x (4x3 suits) = 6840

5 possible ranks (j) for set

j possible starts for run of 4

6-j possible starts for fun of 3

2 orders x 35 config x (4x3 suits) = 840

### One Overlap 3384

#### R4/R4/S3 1584

9 possible ranks (j) for set

j possible starts for run of 4

2 orders x 45 config x (4x3 suits) = 1080

6 possible ranks (j) for set

7-j possible starts for run of 4

2 orders x 21 config x (4x3 suits) = 504

#### R5/R3/S3 1800

2 orders x 54 config x (4x3 suits) = 1296

9 possible ranks (j) for set

j+1 possible starts for run of 3

2 orders x 54 config x (4x3 suits) = 1296

6 possible ranks (j) for set

7-j possible starts for run of 3

2 orders x 21 config x (4x3 suits) = 504

# 1 Run / 2 Sets 42576

## Run suit in neither set 1440

### R4/S3/S3 1440

\* 10 run starts x (36 set ranks) x 4 suits = 1440

## Run suit in one set 13320

### No Overlap 10152

#### R3/S4/S3 3240

2 orders x (8x9x10/6 config) x 4 suits = 960

8 possible ranks (j) for set of 4

j possible starts (k) for run

k possible starts for set of 3

2 orders x (9x10x11/6 config) x 4 suits = 1320

9 possible ranks (j) for set of 4

j possible starts (k) for set of 3

k possible starts for run

2 orders x (8x9x10/6 config) x 4 suits = 960

8 possible ranks (j) for set of 3

j possible starts (k) for set of 4

k possible starts for run

#### R4/S3/S3 6912

2 orders x (7x8x9/6 config) x (4x3) suits = 2016

2 orders x (8x9x10/6 config) x (4x3) suits = 2880

2 orders x (7x8x9/6 config) x (4x3) suits = 2016

### One Overlap 3168

#### R4/S4/S3 (overlaps S4) 1440

2 orders x (9x10/2 config) x 4 suits = 360

2 orders x (9x10/2 config) x 4 suits = 360

2 orders x (9x10/2 config) x 4 suits = 360

2 orders x (9x10/2 config) x 4 suits = 360

#### R5/S3/S3 1728

2 orders x (8x9/2 config) x (4x3 suits) = 864

2 orders x (8x9/2 config) x (4x3 suits) = 864

## Run suit in both sets 29544

### No Overlap 17856

#### R3/S4/S3 7776

2 orders x (8x9x10/6 config) x (4x3 suits) = 2880

2 orders x (8x9x10/6 config) x (4x3 suits) = 2880

2 orders x (7x8x9/6 config) x (4x3 suits) = 2016

R4/S3/S3 10080

2 orders x (7x8x9/6 config) x (4x3 suits) = 2016

2 orders x (7x8x9/6 config) x (4x3x2 suits) = 4032

2 orders x (6x7x8/6 config) x (4x3 suits) = 1344

2 orders x (6x7x8/6 config) x (4x3x2 suits) = 2688

### One Overlap 10296

#### R3/S4/S4 1080

2 orders x (9x10/2 config) x 3 ranks x 4 suits = 1080

#### R4/S4/S3 (overlaps S4) 3456

2 orders x (8x9/2 config) x 4 ranks x (4x3 suits) = 3456

#### R4/S4/S3 (overlaps S3) 1728

2 orders x (8x9/2 config) x 2 ranks x (4x3 suits) = 1728

#### R5/S3/S3 4032

2 orders x (7x8/2 config) x 2 ranks x (4x3x3 suits) = 4032

### Two Overlaps 1392

#### R4/S4/S4 240

10 run starts x 6 set ranks x 4 suits = 240

#### R5/S4/S3 864

2 orders x 9 run starts x 4 set ranks x (4x3 suits) = 864

#### R6/S3/S3 288

8 run starts x (4x3x3 suits) = 288

8 run starts x (4x3x3 suits) = 288

# TOTAL 136190

# Math

## Summation formulas:

## General “slop” equation

The number of the configurations for run starts in a given row (suit) suit is a function of the amount of “slop,” i.e. the number of cells not allocated to blocks (runs/sets) or required whitespace.

s

l

o

p

**Let S = slop** (in the figure above, that would be 5)

The first block can start in any of (1+S) positions (j=1,…,S+1)

If applicable, the second block can start in any of (2+S-j) positions (k=1,…2+S-j)

If applicable, the third block can start in any of (3+S-j-k) positions

**Single Block Configurations:**

**Two Block Configurations:**

**Three Block Configurations:**

## Common Scenarios

### A row with a single run of length n 14-n

*S = 13-n*

### A row with two runs of lengths n and m (3,3): 28, (3,4): 21, (3,7): 6

Let N = n+m+1 (required whitespace). S = 13-N. Config = (14-N)(15-N)/2

### A row of three runs 4

N must be 3 + 3 + 4 = 10. S = 1 (two required whitespace)

Slop space can appear in one of 4 places

### A row of one run of length n + 1 set7:21, 6:28, 5:36, 4:45, 3:55

S = 12-n. Config = (13-n)(14-n)/2

### A row of one run of length n + 1 set *+ space* 6:21, 5:28, 4:36, 3:45

S = 11-n. Config = (12-n)(11-n)/2

### A row of one run of length n + 2 sets 3:165, 4:120

S = 11-n. Config = (12-n)(13-n)(14-n)/6

### A row of two runs of lengths 3 and 4 + 1 set of 3 (outside runs) 35

S=4. Config = (5)(6)(7)/6

### A row of two runs of lengths 3 and 4 + 1 set of 3 (inside runs) 56

S = 5. Config = (6)(7)(8)/6

### A row of two runs of lengths 3 + 1 set of 4 (outside runs) 35

*Whitespace is necessary to avoid double counting (R4S3 or R3S4)*

S=4. Config = (5)(6)(7)/6

### A row of two runs of lengths 3 + 1 set of 4 (inside runs) 35

*Whitespace is necessary to avoid double counting (R4S3R3 or R3S3R4 or R3S4R3)*

S=4. Config = (5)(6)(7)/6