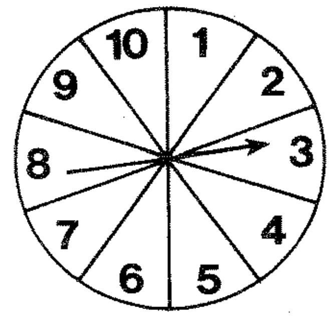
What Is Long And Yellow And Never Rings?

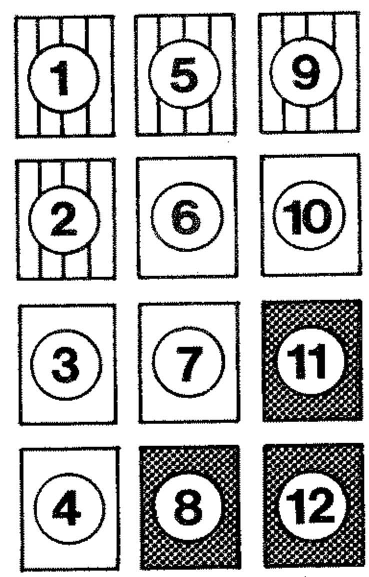
Find the answer to any question below in the boxes at the bottom of the page. Write the letter of that question in the box above its correct answer. Keep working and you will discover the answer to the title question.

A spinner is shown at the right. If the arrow is spun, what is the probability that it will stop on:



Ⓔ a multiple of 3?
Ⓝ a multiple of 2?
Ⓐ a multiple of 3 *and* a multiple of 2?
Ⓘ a multiple of 3 *or* a multiple of 2?

Suppose that one card is drawn at random from the 12 cards shown at the right. What is the probability that the card is:



Ⓐ white?
Ⓝ numbered with a multiple of 3?
Ⓓ white *and* numbered with a multiple of 3?
Ⓝ white *or* numbered with a multiple of 3?
Ⓣ shaded?
Ⓐ numbered with a number less than 10?
Ⓝ shaded *and* numbered with a number less than 10?
Ⓤ shaded *or* numbered with a number less than 10?

Pink and Purple Car Company owns the following cars: 1 pink Ford, 4 pink Chevrolets, 5 purple Fords, and 3 purple Chevrolets. If one of these cars is chosen at random, what is the probability that it is:

Ⓐ a Ford?
Ⓢ pink?
Ⓑ pink *and* a Ford?
Ⓛ pink *or* a Ford?

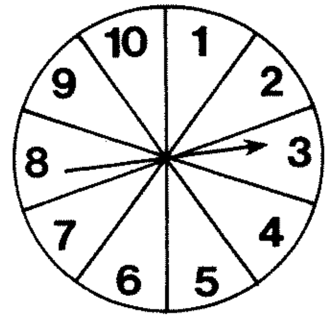
	PINK	PURPLE
FORD	1	5
CHEVROLET	4	3

$\frac{1}{10}$	$\frac{7}{12}$	$\frac{11}{12}$	$\frac{1}{3}$	$\frac{10}{13}$	$\frac{7}{10}$	$\frac{5}{13}$	$\frac{1}{4}$	$\frac{3}{10}$	$\frac{1}{6}$	$\frac{1}{13}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{6}{13}$	$\frac{1}{12}$	$\frac{5}{12}$

What Is Long And Yellow And Never Rings?

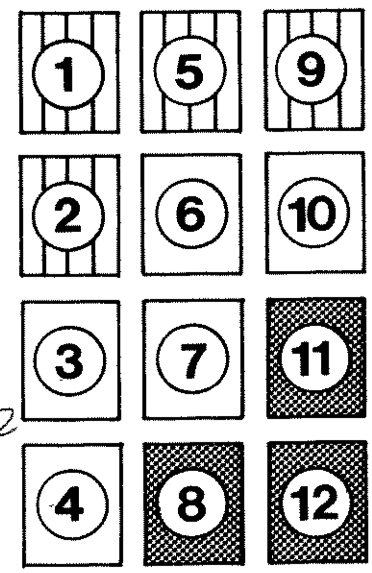
Find the answer to any question below in the boxes at the bottom of the page. Write the letter of that question in the box above its correct answer. Keep working and you will discover the answer to the title question.

A spinner is shown at the right. If the arrow is spun, what is the probability that it will stop on:



Ⓔ a multiple of 3? 3/10
Ⓝ a multiple of 2? 5/10 = 1/2
Ⓐ a multiple of 3 *and* a multiple of 2? 1/10
Ⓘ a multiple of 3 *or* a multiple of 2? 7/10

Suppose that one card is drawn at random from the 12 cards shown at the right. What is the probability that the card is:



Ⓐ white? 5/12
Ⓝ numbered with a multiple of 3? 4/12 = 1/3
Ⓓ white *and* numbered with a multiple of 3? 2/12 = 1/6
Ⓝ white *or* numbered with a multiple of 3? 7/12
Ⓣ shaded? 3/12 = 1/4
Ⓐ numbered with a number less than 10? 9/12 = 3/4
Ⓝ shaded *and* numbered with a number less than 10? 1/12
Ⓤ shaded *or* numbered with a number less than 10? 11/12

Pink and Purple Car Company owns the following cars: 1 pink Ford, 4 pink Chevrolets, 5 purple Fords, and 3 purple Chevrolets. If one of these cars is chosen at random, what is the probability that it is:

Ⓐ a Ford? 6/13
Ⓢ pink? 5/13
Ⓑ pink *and* a Ford? 1/13
Ⓛ pink *or* a Ford? 10/13

	PINK	PURPLE
FORD	1	5
CHEVROLET	4	3

A	N	U	N	L	I	S	T	E	D	B	A	N	A	N	A
$\frac{1}{10}$	$\frac{7}{12}$	$\frac{11}{12}$	$\frac{1}{3}$	$\frac{10}{13}$	$\frac{7}{10}$	$\frac{5}{13}$	$\frac{1}{4}$	$\frac{3}{10}$	$\frac{1}{6}$	$\frac{1}{13}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{6}{13}$	$\frac{1}{12}$	$\frac{5}{12}$

Roll Two Dice

2	3	4	5	6	7	8	9	10	11	12

Finish Line

Roll Two Dice

2	3	4	5	6	7	8	9	10	11	12

Finish Line

#4

COMPUTING PROBABILITIES WITH 2 DICE

We will analyze the situation where two standard 6-sided dice are tossed. First we will look at all the possible outcomes. Finish listing all ordered pairs possible.

	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)			
2						
3						
4						
5						
6						

Now, we will look at the sums that are possible for the 2 dice

Sum	2	3	4	5	6	7	8	9	10	11	12
probability of the sum occuring											

10. Using your results from Exercise 4a in Section 28.1, find the following probabilities for the toss of two dice.

a. P(sum = 5 or sum = 6)   b. P(sum = 14)

c. P(sum = 9 or more)   d. P(sum = 12 or less)

e. P(sum < 11)   f. P(sum at least 9)

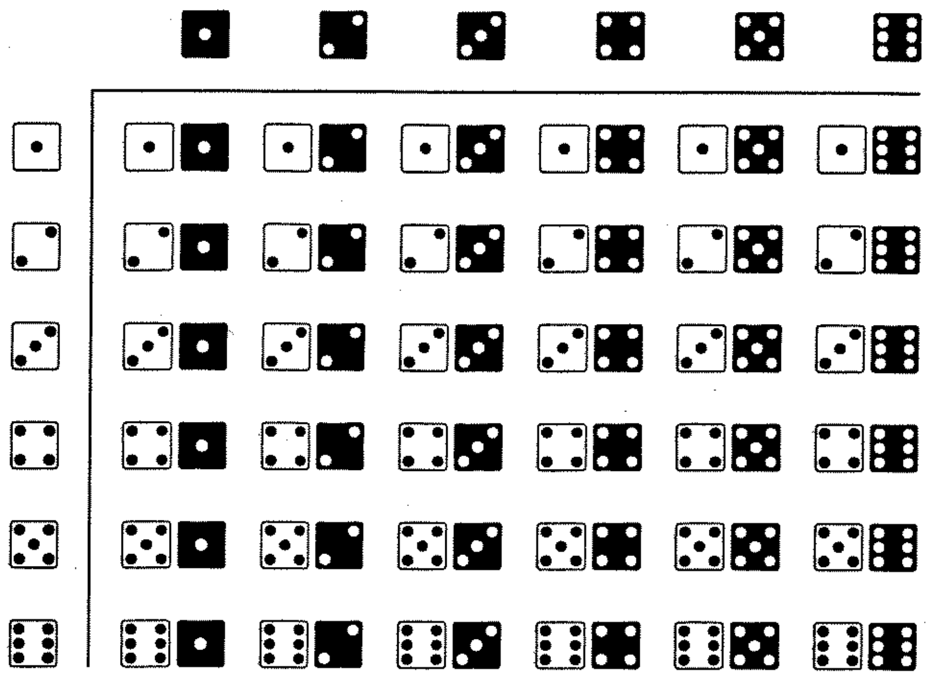
g. P(sum is not 7)   h. P(sum is not 5)

i. P(sum is at most 5)

j. P(4 on red die and 6 on white die)

k. P(4 on red die or 6 on white die)

SOME TABLES FOR CLASSICAL PROBABILITY



Standard Deck of Cards

A	2	3	4	5	6	7	8	9	10	J	Q	K
♥	♥	♥	♥	♥	♥	♥	♥	♥	♥	♥	♥	♥
A	2	3	4	5	6	7	8	9	10	J	Q	K
♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
A	2	3	4	5	6	7	8	9	10	J	Q	K
♠	♠	♠	♠	♠	♠	♠	♠	♠	♠	♠	♠	♠
A	2	3	4	5	6	7	8	9	10	J	Q	K
♣	♣	♣	♣	♣	♣	♣	♣	♣	♣	♣	♣	♣

#4

COMPUTING PROBABILITIES WITH 2 DICE

We will analyze the situation where two standard 6-sided dice are tossed. First we will look at all the possible outcomes. Finish listing all ordered pairs possible.

	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

Now, we will look at the sums that are possible for the 2 dice

Sum	2	3	4	5	6	7	8	9	10	11	12
probability of the sum occuring	1/36	2/36	3/36	4/36	5/36	6/36	5/36	4/36	3/36	2/36	1/36

10. Using your results from Exercise 4a in Section 28.1, find the following probabilities for the toss of two dice.

9/36 a. P(sum = 5 or sum = 6) b. P(sum = 14) 0

10/36 c. P(sum = 9 or more) d. P(sum = 12 or less) 36/36 = 1

33/36 e. P(sum < 11) f. P(sum at least 9) 10/36

30/36 g. P(sum is not 7) h. P(sum is not 5) 32/36

10/36 i. P(sum is at most 5)

1/36 j. P(4 on red die and 6 on white die)

11/36 k. P(4 on red die or 6 on white die)

HOMEWORK 28.2

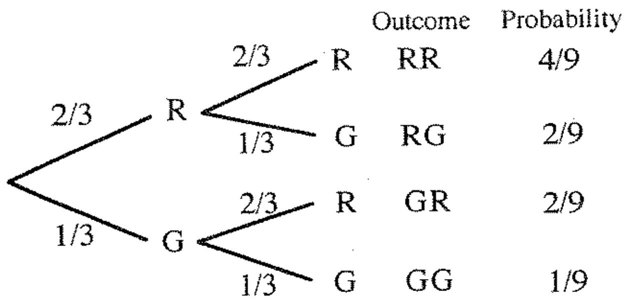
1. H1, H2, H3, H4, H5, H6,T1, T2, T3, T4, T5, T6

   P(H3) = 1/12 P(H3 or H4) = 2/12 P(H even or H2) = 3/12 = ¼

2. R1, R2, R3, R4, R5, R6, B1, B2, B3, B4, B5, B6, G1, G2, G3, G4, G5, G6

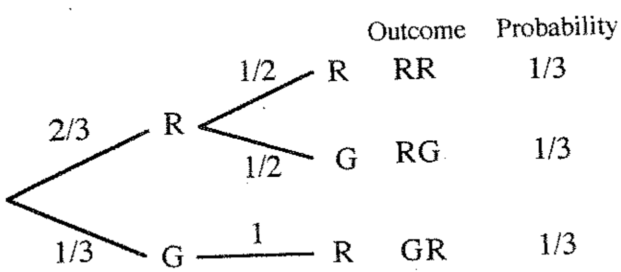
   P(R6 or R2) = 2/18 = 1/9 P(R or G) = 12/18 = 2/3 P(R3 or G3) = 2/18 = 1/9

3. a.



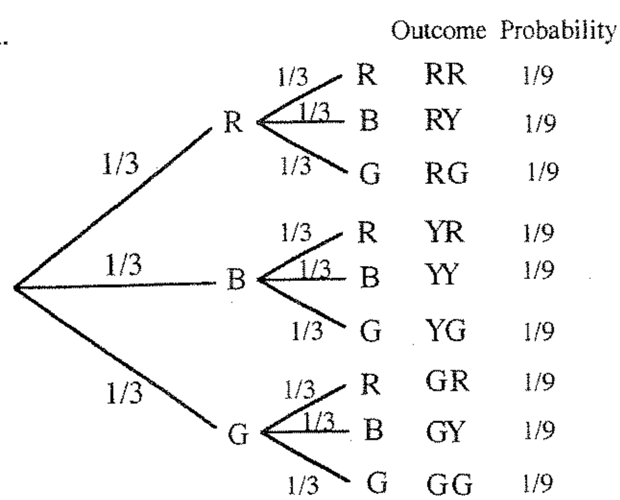
b. $\frac{4}{9}$ c. $\frac{5}{9}$ d. $\frac{4}{9}+\frac{5}{9}-\frac{4}{9}=\frac{5}{9}$ e. $\frac{5}{9}$

4a.



b. $\frac{1}{3}$ 4c. $\frac{1}{3}$ 4d. $\frac{1}{3}$ 4e. $\frac{2}{3}$

5. a.

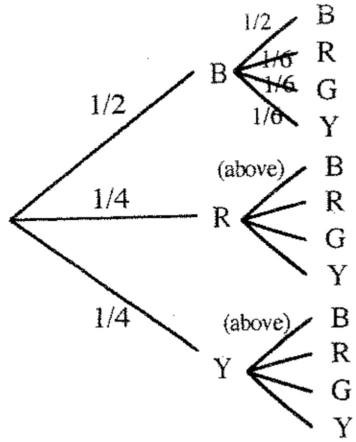


b. $\frac{1}{9}$ 5c. $\frac{3}{9}\,or\,\frac{1}{3}$

5d. $\frac{1}{9}+\frac{3}{9}-\frac{1}{9}=\frac{3}{9}\,or\,\frac{1}{3}$

5e. $\frac{2}{9}+\frac{1}{9}=\frac{3}{9}\,or\,\frac{1}{3}$

6. a.



Outcome	Probability
BB	1/4
BR	1/12
BG	1/12
BY	1/12
RB	1/8
RR	1/24
RG	1/24
RY	1/24
YB	1/8
YR	1/24
YG	1/24
YY	1/24

b. $\frac{1}{24}$ c. $\frac{1}{4}+\frac{1}{24}+\frac{1}{24}=\frac{8}{24}=\frac{1}{3}$ d. $\frac{1}{24}+\frac{8}{24}-\frac{1}{24}=\frac{8}{24}$

f. Red on one of the spins is $\frac{1}{12}+\frac{1}{8}+\frac{1}{24}+\frac{1}{24}+\frac{1}{24}+\frac{1}{24}=\frac{9}{24}$

Yellow on one of the spins is $\frac{1}{12}+\frac{1}{24}+\frac{1}{8}+\frac{1}{24}+\frac{1}{24}+\frac{1}{24}=\frac{9}{24}$

The intersection (or overlap) includes the cases RY and YR: $\frac{1}{24}+\frac{1}{24}=\frac{2}{24}$

Therefore P(red on one of the two spins or yellow on one of the two spins) $=\frac{9}{24}+\frac{9}{24}-\frac{2}{24}=\frac{16}{24}=\frac{2}{3}$ Simply adding the probabilities above where there is one R or one Y or both will also yield $\frac{2}{3}$.

7. a.

BBR	BBY	BGR	BGY	BYR	BYY
RBR	RBY	RGR	RGY	RYR	RYY
GBR	GBY	GGR	GGY	GYR	GYY
YBR	YBB	YGR	YGY	YYR	YYY

b. P(all one color) = $\frac{1}{24}$ P(red on one spinner) = $\frac{1}{2}$ There is no overlap.

$\frac{1}{24}+\frac{1}{2}=\frac{13}{24}$

c. P(blue on at least one spin) = $\frac{12}{24}$ and P(yellow on at least one spin) = $\frac{18}{24}$

P(blue on at least one spin AND yellow on at least one spin) = $\frac{8}{24}$

P(blue on at least one spin or yellow on at least one spin) = $\frac{12}{24}+\frac{18}{24}-\frac{8}{24}=\frac{22}{24}$

Note that this answer can be found also by counting all outcomes with at least one blue or one yellow. There are 22 such outcomes.

8. a.

B1	B2	B3	B4	B5	B6
R1	R2	R3	R4	R5	R6
Y1	Y2	Y3	Y4	Y5	Y6
G1	G2	G3	G4	G5	G6

b. $\frac{2}{24}$ c. $\frac{3}{24}$ d. $\frac{4}{24}$