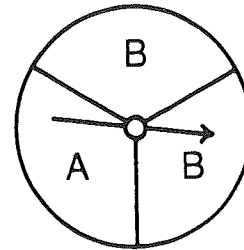
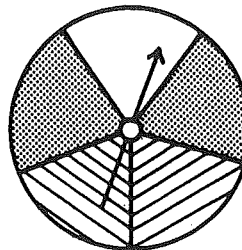


What Do the Police Put On a Bad Pig?

Cross out the box containing each correct answer. (If an answer appears more than once, it doesn't matter which one you cross out.) When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

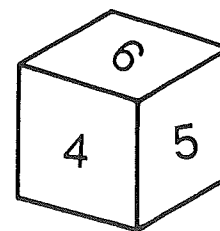
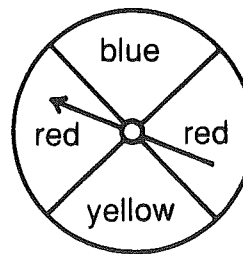
I. Find each probability if you spin both spinners.

- ① P(white, A)
- ② P(white, B)
- ③ P(striped, A)
- ④ P(striped, B)
- ⑤ P(not striped, A)
- ⑥ P(not striped, B)
- ⑦ P(not white, A)
- ⑧ P(not white, B)



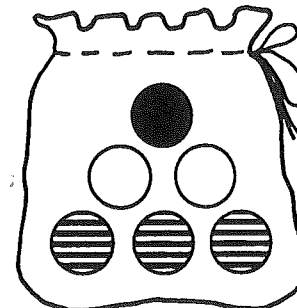
II. Find each probability if you spin the spinner and roll the number cube.

- ⑨ P(blue, 2)
- ⑩ P(blue, not 2)
- ⑪ P(yellow, even)
- ⑫ P(red, even)
- ⑬ P(not blue, 5)
- ⑭ P(not blue, odd)
- ⑮ P(red, 4)
- ⑯ P(red, not 4)



III. Find each probability if you pick one marble, replace it, then pick a second marble.

- ⑰ P(black, white)
- ⑱ P(white, striped)
- ⑲ P(black, black)
- ⑳ P(white, not white)
- ㉑ P(black, striped)
- ㉒ P(not white, striped)
- ㉓ P(striped, striped)
- ㉔ P(not white, not white)



IV. Solve.

- ⑳ A test has two multiple choice questions, each with five choices. What is the probability of guessing the correct answer to both questions?
- ㉑ One letter is randomly selected from the word *MATH*, and a second letter is randomly selected from the word *JOKES*. What is the probability that both letters are vowels?

A	T	T	N	O	H	E	E	A	T	P	P	I	M	G	C	O
$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{15}$	$\frac{1}{16}$	$\frac{1}{18}$	$\frac{1}{20}$	$\frac{1}{24}$
T	H	O	U	G	S	S	L	F	A	E	E	F	A	T	S	E
$\frac{1}{25}$	$\frac{1}{36}$	$\frac{2}{5}$	$\frac{2}{7}$	$\frac{2}{9}$	$\frac{2}{15}$	$\frac{2}{15}$	$\frac{3}{8}$	$\frac{3}{10}$	$\frac{4}{9}$	$\frac{4}{15}$	$\frac{4}{15}$	$\frac{5}{8}$	$\frac{5}{12}$	$\frac{5}{24}$	$\frac{7}{15}$	$\frac{8}{15}$

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

What Do You Get if a Bunch of Bad Guys Fall in the Ocean?

Cross out the box containing each correct answer. (If an answer appears more than once, it doesn't matter which one you cross out.) When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

I. Find each probability if you pick a card, do *not* replace it, then pick a second card.

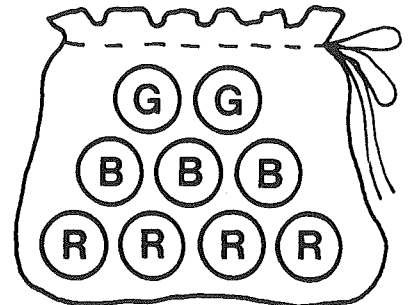
- ① P(black, then white) ② P(black, then black)
 ③ P(white, then black) ④ P(white, then white)

II. Each letter of the word *BANANA* is written on a card. Find each probability if you pick two cards without replacing the first.

- ⑤ P(B, then N) ⑥ P(B, then A) ⑦ P(N, then B) B A N
 ⑧ P(N, then A) ⑨ P(A, then B) ⑩ P(A, then N) A N A
 ⑪ P(N, then N) ⑫ P(A, then A) ⑬ P(B, then B)

III. Find each probability if you pick a marble, do not replace it, then pick a second marble. (R = red; B = blue; G = green)

- ⑭ P(blue, then green) ⑮ P(green, then red)
 ⑯ P(green, then green) ⑰ P(green, then not green)
 ⑱ P(red, then blue) ⑲ P(red, then not blue)
 ⑳ P(blue, then blue) ㉑ P(not blue, then not blue)



IV. Solve.

- ㉒ There were 6 purple socks and 4 orange socks in a drawer. Zucky picked one sock without looking and then another without looking (or replacing the first). What is the probability that he picked 2 purple socks?
 ㉓ There are 10 boxes in a grab bag. The boxes are identical except that 7 of them contain \$20 bills. A contest winner gets to pick two boxes from the grab bag. What is the probability of getting two \$20 bills?

TH	AN	IT	IT	IT	PL	AC	ES	EY	EY	ON	ON	RI	DE
0	$\frac{1}{3}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{14}$	$\frac{1}{15}$
DE	DE	SO	ME	ET	WA	TE	AM	LL	RS	VE	RY	ST	ST
$\frac{1}{15}$	$\frac{1}{15}$	$\frac{1}{36}$	$\frac{2}{5}$	$\frac{3}{28}$	$\frac{4}{9}$	$\frac{5}{12}$	$\frac{5}{14}$	$\frac{5}{18}$	$\frac{7}{15}$	$\frac{7}{18}$	$\frac{7}{36}$	$\frac{15}{56}$	$\frac{15}{56}$

What Did The Electrician Say When His Son Came Home Late?

TO ANSWER THIS QUESTION, FOLLOW THESE INSTRUCTIONS: This puzzle contains 15 blocks of information and questions, called *FRAMES*. Read the frames in order. For each frame, select the correct answer from the two choices given. Write the letter of the correct choice in the box at the bottom of page 2 that contains the frame number.

1	<p>Suppose you toss two coins at the same time. There is a certain probability of getting two heads. Or, suppose you roll two dice. There is a certain probability of getting a total of 7. This puzzle will help you figure out these probabilities.</p> <p>First, let's consider tossing coins. How many outcomes are possible if you toss one coin?</p> <p style="text-align: center;">(I) 2 outcomes (R) 4 outcomes</p>										
2	<p>The answer to the first frame is, of course, <i>2 outcomes</i>. If you toss one coin, you get either a head or a tail. Each of these outcomes is <i>EQUALLY LIKELY</i>—that is, each will happen about as often as the other.</p> <p>When you toss a coin, the probability of getting a head is 1 out of 2, or:</p> <p style="text-align: center;">(E) $\frac{1}{2}$ (L) $\frac{1}{3}$</p>										
3	<p>Suppose you toss a penny and a dime together. How many <i>EQUALLY LIKELY</i> outcomes are there? You might guess there are three: 2 heads; 2 tails; 1 head and 1 tail. This is incorrect. Actually, there are <i>FOUR</i> equally likely outcomes. They are listed at the right.</p> <p>Now, answer the question. How many equally likely outcomes are there when you toss a penny and a dime?</p> <p style="text-align: center;">(A) 5 (S) 4</p> <table border="1" style="float: right; margin-left: 20px;"> <thead> <tr> <th>PENNY</th> <th>DIME</th> </tr> </thead> <tbody> <tr> <td>heads</td> <td>heads</td> </tr> <tr> <td>tails</td> <td>tails</td> </tr> <tr> <td>heads</td> <td>tails</td> </tr> <tr> <td>tails</td> <td>heads</td> </tr> </tbody> </table>	PENNY	DIME	heads	heads	tails	tails	heads	tails	tails	heads
PENNY	DIME										
heads	heads										
tails	tails										
heads	tails										
tails	heads										
4	<p>One outcome is getting 2 heads. Another outcome is getting 2 tails. The third outcome is getting penny heads and dime tails. The fourth outcome is getting penny tails and dime heads.</p> <p>Since getting two heads is 1 of 4 equally likely outcomes, what is the probability of getting two heads?</p> <p style="text-align: center;">(I) $\frac{1}{4}$ (M) $\frac{1}{2}$</p>										
5	<p>What is the probability of getting two tails? (S) $\frac{1}{5}$ (E) $\frac{1}{4}$</p>										
6	<p>The answer to both questions 4 and 5 is, of course, $\frac{1}{4}$. Now, what is the probability of getting 1 head and 1 tail? Remember, there are <i>TWO WAYS</i> to do this: penny heads and dime tails; penny tails and dime heads. So the probability is 2 out of 4, or:</p> <p style="text-align: center;">(E) $\frac{1}{5}$ (O) $\frac{1}{2}$</p>										
7	<p>If the probability of getting 1 head and 1 tail is $\frac{1}{2}$, then if you toss 2 coins together 100 times, about how many times would you expect to get 1 head and 1 tail?</p> <p style="text-align: center;">(T) 30 (A) 50</p>										

8	<p>The method we used for the coin problem has two steps: (1) listing all equally likely outcomes; and (2) seeing how many of these outcomes are in the <i>EVENT</i> we are talking about. An <i>EVENT</i> is a certain subset of outcomes, like getting 1 head and 1 tail.</p> <p>Let's apply this method to dice rolling. How many equally likely outcomes are there if you roll 1 regular 6-faced die?</p> <p style="text-align: center;">(U) 6 (R) 4</p>																																				
9	<p>Suppose you roll two dice, 1 red and 1 green. We can make a chart to see all equally likely outcomes. This chart is at the right. The first number in each pair is on the red die; the second number is on the green die.</p> <p>By counting the number of pairs, you discover how many equally likely outcomes there are. How many are there?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr><td>(1,1)</td><td>(1,2)</td><td>(1,3)</td><td>(1,4)</td><td>(1,5)</td><td>(1,6)</td></tr> <tr><td>(2,1)</td><td>(2,2)</td><td>(2,3)</td><td>(2,4)</td><td>(2,5)</td><td>(2,6)</td></tr> <tr><td>(3,1)</td><td>(3,2)</td><td>(3,3)</td><td>(3,4)</td><td>(3,5)</td><td>(3,6)</td></tr> <tr><td>(4,1)</td><td>(4,2)</td><td>(4,3)</td><td>(4,4)</td><td>(4,5)</td><td>(4,6)</td></tr> <tr><td>(5,1)</td><td>(5,2)</td><td>(5,3)</td><td>(5,4)</td><td>(5,5)</td><td>(5,6)</td></tr> <tr><td>(6,1)</td><td>(6,2)</td><td>(6,3)</td><td>(6,4)</td><td>(6,5)</td><td>(6,6)</td></tr> </tbody> </table> <p style="text-align: center;">(S) 32 (Y) 36</p>	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)
(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)																																
(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)																																
(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)																																
(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)																																
(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)																																
(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)																																
10	<p>Usually when you roll two dice, you are interested in the <i>SUM</i> of the two numbers you get. For example, red 1 and green 4 adds up to 5. But there are actually <i>FOUR</i> different ways to get a sum of 5: (red 1, green 4); (red 2, green 3); (red 3, green 2); (red 4, green 1).</p> <p>So, of the 36 equally likely outcomes, four of them are sums of 5. The probability of getting 5 is 4 out of 36, or:</p> <p style="text-align: center;">(T) $\frac{1}{9}$ (R) $\frac{1}{7}$</p>																																				
11	<p>There is only one way to get a sum of 2. (Both dice have to come up 1.) So the probability of getting 2 is:</p> <p style="text-align: center;">(L) $\frac{1}{36}$ (H) $\frac{5}{36}$</p>																																				
12	<p>How many of the 36 outcomes are sums of 10? The probability of getting 10 is:</p> <p style="text-align: center;">(F) $\frac{1}{6}$ (N) $\frac{1}{12}$</p>																																				
13	<p>The probability of getting 8 is: (R) $\frac{5}{36}$ (T) $\frac{7}{36}$</p>																																				
14	<p>The probability of getting 7 is: (F) $\frac{1}{4}$ (W) $\frac{1}{6}$</p>																																				
15	<p>The method we used for both the coin problem and the dice problem has two steps. These two steps are: (1) listing all equally likely outcomes; and (2) seeing how many of those outcomes are:</p> <p style="text-align: center;">(U) in the event we are talking about. (G) not in the event we are talking about.</p>																																				
14	1	13	2	9	6	8	4	12	3	15	11	7	10	5	?																						

Why Don't We Wear Paper Clothes?

Find the answer to any question below in the code key. Notice the letter next to it. Print this letter in the box at the bottom of the page that contains the problem number. Keep working and you will discover the answer to the title question.

CODE KEY

$\frac{1}{4}$	B
$\frac{1}{2}$	R
$\frac{1}{8}$	E
$\frac{6}{25}$	T
$\frac{4}{25}$	H
$\frac{3}{5}$	Y
$\frac{1}{16}$	A
$\frac{9}{25}$	L

Suppose a coin is tossed 3 times. What is the probability of:

- ① getting 3 heads?
- ② getting 3 tails?
- ③ getting ANY particular outcome (such as head, tail, tail)?

Suppose a coin is tossed 4 times. What is the probability of:

- ④ getting 4 heads?
- ⑤ getting any particular outcome?
- ⑥ Suppose you toss a coin 4 times and get 4 heads. What is the probability of getting a head on the 5th toss?
- ⑦ Suppose you toss a coin 10 times and get 10 tails. What is the probability of getting a tail on the 11th toss?



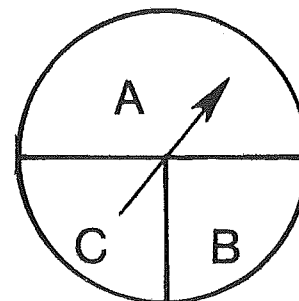
- ⑧ Suppose a jar contains 3 red marbles and 2 white marbles. If a marble is drawn at random, what is the probability it is red?

Suppose a jar contains 3 red marbles and 2 white marbles. If one marble is drawn at random, then replaced, and then another marble is drawn at random, what is the probability of:

- ⑨ drawing a red marble on both draws?
- ⑩ drawing a red marble, then a white marble?
- ⑪ drawing a white marble on both draws?
- ⑫ drawing a white marble, then a red marble?



The spinner at the right is designed so that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{4}$, and $P(C) = \frac{1}{4}$. If the arrow is spun twice, what is the probability of the spinner landing on:



- ⑬ A on both spins?
- ⑭ A, then B?
- ⑮ B on both spins?

10	11	3	8	5	6	1	12	14	4	7	15	13	9	2
----	----	---	---	---	---	---	----	----	---	---	----	----	---	---

C
O
D
E

L
I
N
E

DIRECTIONS:

Figure out the answer to any question below. Then find your answer in the coded line at the bottom of the page.

Each time the answer appears in the code, write the letter of that question above it.

KEEP WORKING AND YOU WILL DECODE THE LINE.

- (A) How many arrangements of the letters M, A, T, and H are possible if each letter can be used only once in each arrangement?
- (S) Six people are to be seated in a row of six chairs. How many different seating arrangements are possible?
- (D) There are 3 roads connecting Towns A and B, and 4 roads connecting Towns B and C. How many different routes are there from Town A to Town C?
- (O) The GT Dragger offers 5 different engines, 4 different paint jobs, and 2 different radios. How many different "packages" are possible?
- (I) How many different batting orders are possible for the 9 men on a baseball team?
- (V) Orgo has 5 pairs of pants, 6 sport shirts, and 3 belts. How many different outfits can he make using these items?
- (L) How many different 2-letter arrangements can be selected from the set {S,H,A,R,K}?
- (P) How many 3-letter arrangements are possible using the 26 letters of the alphabet if no letter can be used more than once?
- (R) If a school offers 9 different subjects, how many different schedules of 5 classes are possible?
- (C) In how many different ways can a president, vice president, and secretary be elected from a class of 22 students?
- (E) How many different 4-digit numerals are there? (Hint: zero cannot be used as the first digit.)

TITLE: BIG DRIPS

362,880 9240 362,880 9240 20 9000 720 24 15,120 9000

9000 24 90 9000 720 12 15,120 40 15,600 15,600 9000 15,120 720

Combination Code

Figure out the number of COMBINATIONS for any problem below. Find your answer in the code at the bottom of the page. Each time the answer appears in the code, write the letter of that problem above it. Keep working and you will decode the message.

- Ⓡ 5 objects taken 3 at a time Ⓣ 7 objects taken 2 at a time
Ⓞ 4 objects taken 2 at a time Ⓛ 5 objects taken 5 at a time
ⓔ 6 objects taken 4 at a time ⓓ 9 objects taken 6 at a time

- Ⓝ How many committees of 3 members can be formed from 6 people?
Ⓢ How many committees of 2 members can be formed from 8 people?
ⓖ A student must work any 4 of the 5 problems on a math quiz. How many different selections of problems can be made?
Ⓜ A basketball team has 8 players. How many different 5-man teams are possible if each player can play any position?
Ⓟ Thumba likes to wear 2 rings, one on each thumb. If she has 9 rings to choose from, how many combinations are possible?
ⓕ Gorgeous Gertrude has 7 boy friends. If she can see only 3 of them on a weekend, how many different combinations could she see?
ⓐ A student may choose to read any 4 books from a list of 8 books. How many choices does the student have?
ⓗ In the year 2525, astronauts Milky and Way are blasting around the solar system. If they decide to visit 5 of the 9 planets, how many different selections could they make?
ⓐ Mergatroid has just enough money to buy 2 candy bars. If there are 10 kinds to choose from, how many choices does she have?

TITLE: EVEN ODDS

70-6-56-20-35-1-56-36-36-15-10-28-70-45-20-5-15-21-45-126-15-45-84