Page 367
1 – 4, 9 – 12, 29 – 31

Problem 1
heads—dime, heads—nickel
heads—dime, tails—nickel
tails—dime, heads—nickel
tails—dime, tails—nickel

Problem 2
{ h, d, s, c }

Problem 3
{ Dm, Df, Rm, Rf, Im, If }

Problem 4
1i, 1d, 1s, 2i, 2d, 2s, 3i, 3d, 3s, 4i, 4d, 4s, 5i, 5d, 5s

Problem 9

A	B	C	D	F
$^{4}/_{40}$ or .1	$^{10}/_{40}$ or .25	$^{18}/_{40}$ or .45	$^{6}/_{40}$ or .15	$^{2}/_{40}$ Or .05

Problem 10

A	B	AB	O
.41	.12	.03	.44

Problem 11

Falling behind	$\frac{800}{2000} = .4$
Staying even	$\frac{880}{2000} = .44$
Increasing faster	$\frac{240}{2000} = .12$
Don't know	$\frac{80}{2000} = .04$

Problem 12

0	1	2	3	4	5	6	7
.05	.06	.09	.15	.11	.2	.17	.17

Problem 29
a. P(plea bargained) = $^{62}/_{98}$ = .63265
b. P(tried) = $^{27}/_{98}$ = .27551

Problem 30
a. P(grand prize) = $^{1}/_{100,000}$
b. P(a prize) = $^{531}/_{100,000}$

Problem 31

a. P(favor) = .35

b. P(undecided)

= 1 - .35 - .32

= .33

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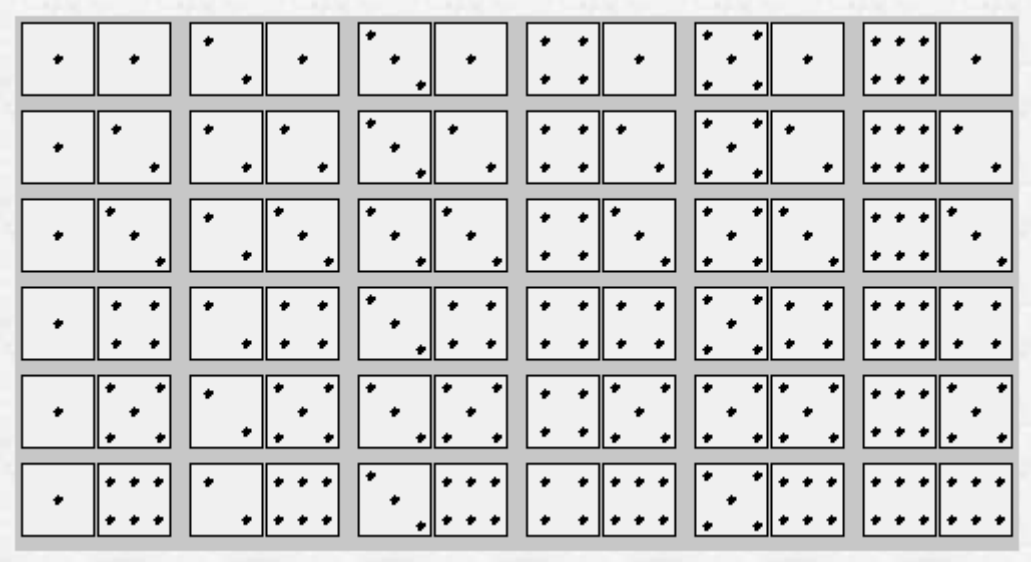
1 – 20, 34 – 35, 40 – 41

Remember there are 36 outcomes when rolling dice:



Problem 1

P(even)

2 →

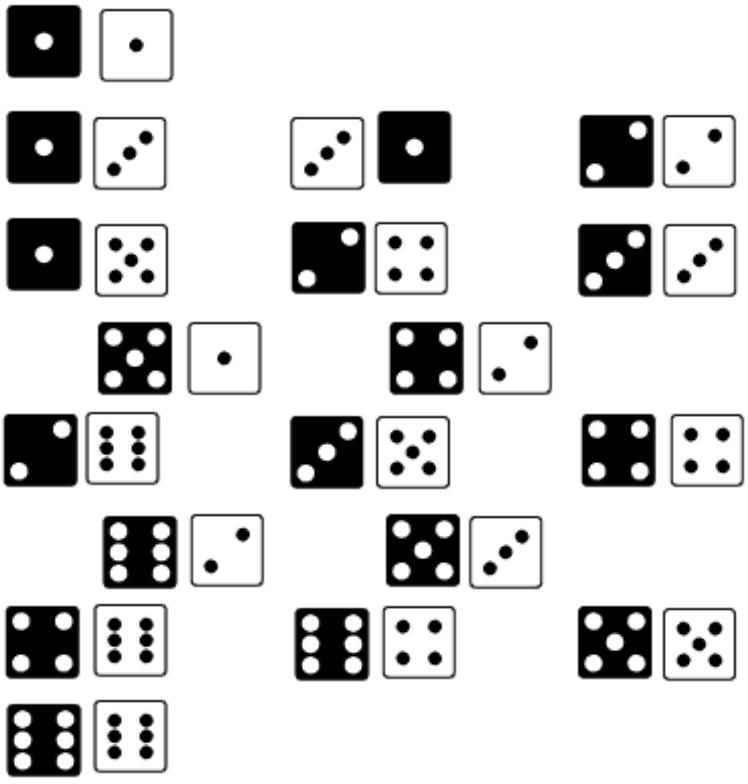
4 →

6 →

8 →

10 →

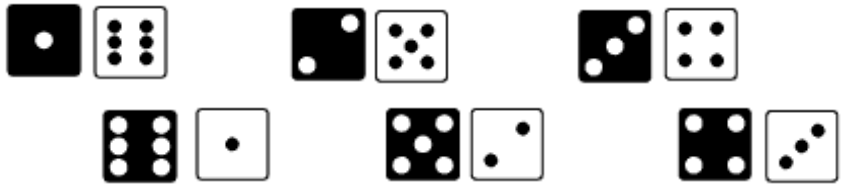
12 →



P(even) = $^{18}/_{36}$ = ½ = .5

(Your common sense would probably tell you it's half even and half odd.)

Problem 2
P(7 or 11)

7 → 

11 → 

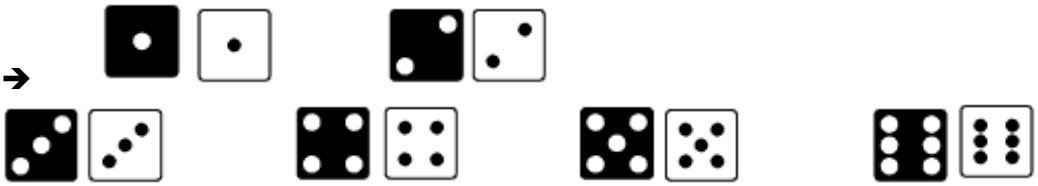
P(7 or 11) = $^{8}/_{36}$ = $^{2}/_{9}$ = .222...

Problem 3

P(pair of 1's) ➔ 

P(pair of 1's) = $^{1}/_{36}$ = .02777…

Problem 4

P(double) ➔ 

P(double) = $^{6}/_{36}$ = $^{1}/_{6}$

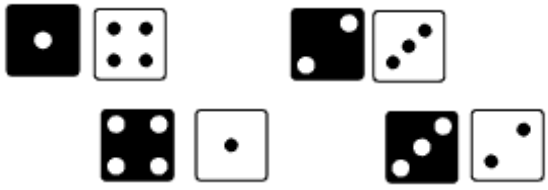
= .1666…

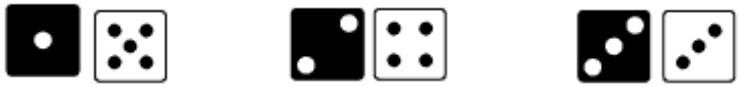
Problem 5
P(one die shows 6, other less than 3)

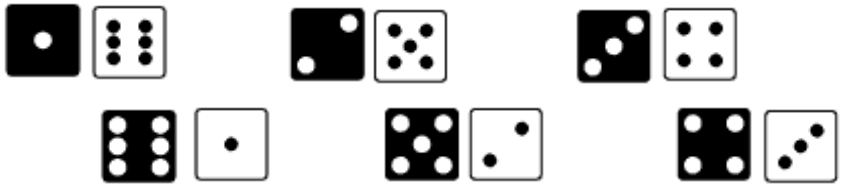
= $^{4}/_{36}$ = $^{1}/_{9}$ = .111...

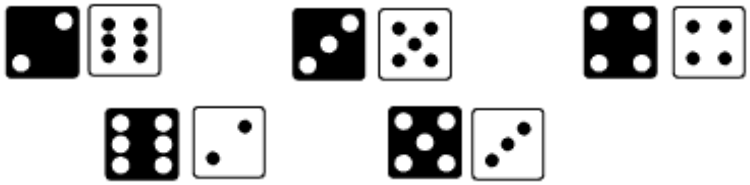
Problem 6
P(at least 4)

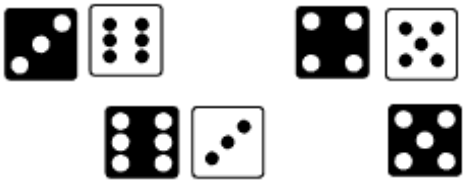
4 → 

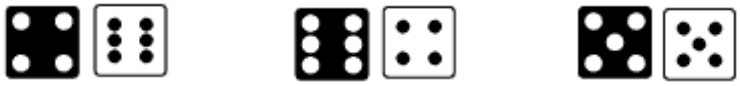
5 → 

6 → 

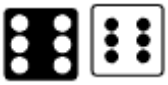
7 → 

8 → 

9 → 

10 → 

11 → 

12 → 

P(at least 4) = $^{33}/_{36}$ = $^{11}/_{12}$

= .91666...

It would be quicker if you realized there are 3 ways to get a 2 or a 3 and take

$1 - {}^{3}/_{36} = {}^{33}/_{36} = {}^{11}/_{12}$

= .91666...

Problem 7

P(K♦) = $^{1}/_{52}$ = .019

Problem 8

P(♦ or K) = $\frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52}$ = $^{4}/_{13}$ = .308

Problem 9

P(face card) = P(J, K, or Q)

$\frac{4}{52} + \frac{4}{52} + \frac{4}{52} = \frac{12}{52}$ = $^{3}/_{13}$ = .231

Problem 10

P(red face card)

J♦, J♥, Q♦, Q♥, K♦, K♥

$^{6}/_{52} = {}^{3}/_{26} = .115$

Problem 11

P(not ace) = $1 - {}^{4}/_{52} = {}^{48}/_{52} = {}^{12}/_{13} = .923$

Problem 12

P(not a black face card)

not(J♣, J♠, Q♣, Q♠, K♣, K♠)

$1 - {}^{6}/_{52} = {}^{46}/_{52} = {}^{23}/_{26} = .885$

Problem 13

P(1st prize) = $^{1}/_{500} = .002$

P(not 1st prize) = $1 - {}^{1}/_{500} = {}^{499}/_{500} = .998$

Problem 14

P(no remote) = $1 - {}^{87}/_{100} = {}^{13}/_{100} = .13$

Problem 15

The probabilities of the sample space should add up to 1, but .3 + .4 + .4 = 1.1

Problem 16

Since { on time, early, late } should cover every possibility, the probabilities should add up to 1. They don't (it's .95)

Problem 17

"Win at least once" is the same as "don't lose every time"

P(lose every time)

$$= \frac{9}{10} \bullet \frac{9}{10} \bullet \frac{9}{10} \bullet \frac{9}{10} \bullet \frac{9}{10} = \frac{59{,}049}{100{,}000}$$

So P(doesn't lose every time)

$$= 1 - \frac{59{,}049}{100{,}000} = \frac{40{,}951}{100{,}000} = .40951$$

Problem 18

Increase and decrease aren't the only possibilities.

It could stay the same.

Problem 20

She could be accepted by more than one college, so she would have to subtract the overlap to get the actual probability.

Problem 34

Types of Vehicles	Cars	Pickups	SUVs	Vans
Deaths	4768	2742	2448	698

There is a total of 10,656 deaths.

a. P(car) = $\frac{4768}{10656} = .45$

b. P(SUV) = $\frac{2448}{10656} = .23$

c. P(pickup **or** SUV)

$= \frac{2742}{10656} + \frac{2448}{10656} = \frac{5190}{10656} = .49$

Problem 35

Method of Preparation	Percent
Computer software	33.9
Accountant	23.6
Tax preparation service	17.4
Spouse, friend, or other relative will prepare	10.8
By hand	14.3

a. P(accountant **or** tax preparation service) = 23.6 + 17.4 = 41% or .41

b. P(not software and not by hand) = 100 – (33.9 + 14.3) = 100 – 48.2 = 51.8% or .518

Problem 40

Source	Coal	Nuclear	Natural gas	Hydropower	Oil	Other
Share, %	50.0	19.3	18.7	6.7	3.0	2.3

a. P(coal or natural gas) = 50.0 + 18.7 = 68.7% or .687

b. P(nonnuclear) = 100 – 19.3 = 80.7% or .807

Problem 41

Country	U.S.	Germany	Canada	Italy	U.K.	France	Japan	Other
Percent	45.1	16.5	6.9	6.1	4.2	3.8	2.5	14.9

a. 45.1 + 16.5 + 6.9 + 6.1 + 4.2 + 3.8 + 2.5 + 14.9 = 100
b. P(U.S. or Canada) = 45.1 + 6.9 = 52% or .52
c. P(NOT Italy, U.K., or France) = 100 – (6.1 + 4.2 + 3.8) = 100 – 14.1 = 85.9% or .859

Here are some additional problems that practice probability:

PAGE 386
1 – 4, 13 – 16
PAGE 399
26, 33

Problem 1
P(heads all 5 times)

$$\frac{1}{2}\bullet\frac{1}{2}\bullet\frac{1}{2}\bullet\frac{1}{2}\bullet\frac{1}{2}=\left(\frac{1}{2}\right)^5=\frac{1}{32}$$

Problem 2
P(exactly one head)
H-T-T-T-T
T-H-T-T-T
T-T-H-T-T
T-T-T-H-T
T-T-T-T-H
There are 32 total possibilities
(because each time you flip there are 2, so it's 2^5)
… So the probability is $^5/_{32}$

Problem 3
P(at least one head)
This is the same as
P(not all tails)
So $1 - {}^1/_{32} = {}^{31}/_{32}$

Problem 4
P(more than one head)
= P(at least 1) – P(exactly 1)
$^{31}/_{32} - {}^5/_{32} = {}^{26}/_{32}$

In Problems 13 – 16, there are 2^3 or 8 total possibilities.

Problem 13
P(2 boys and 1 girl)
B-B-G, B-G-B, G-B-B
… So it's $^3/_8$.

Problem 14

P(at least 1 girl)
means "not B-B-B")
$1 - {}^{1}/_{8} = {}^{7}/_{8}$

Problem 15

P(no girls) … means B-B-B
${}^{1}/_{8}$

Problem 16

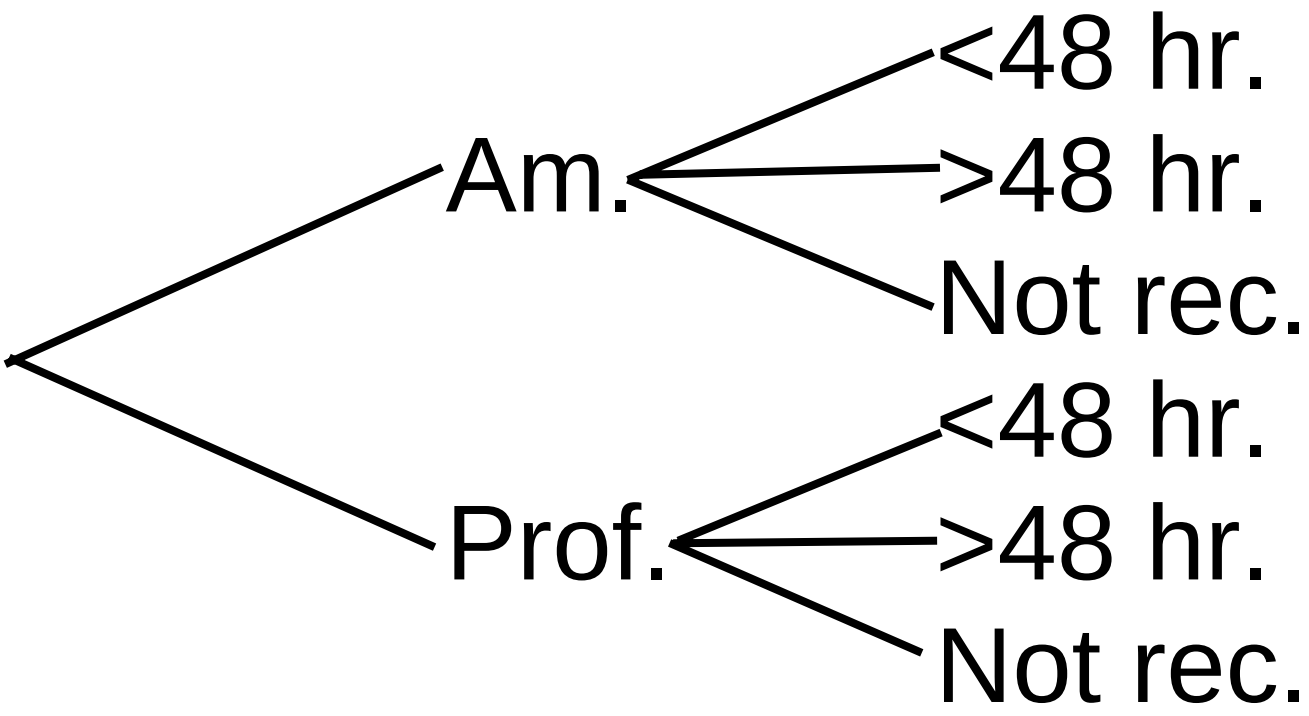
P(2 oldest children are girls)
means G-G-B or G-G-G
${}^{2}/_{8}$

Problem 26

This basically means it is audited **and** additional taxes are levied.
`.02 * .60 =` **`.12`**

Problem 33

a.



b. This is an awkwardly worded question. It's basically saying "If a car is stolen by professionals, what is the probability it is recovered within 48 hours."

- In notation this is P(<48 | prof.)
- This is given in the problem … **24%**

c. "never recovered" could be:

- Amateur **and** not rec.

OR

- Professional **and** not rec.

```
.64*.60 + .36*.04
.384 + .0144 =
```