

Selected homework answers 11.1 & 11.2

p. 525  
 9) a)  $\frac{2}{\quad} \quad \frac{4}{\quad} \leftarrow \text{Case ① } 1 \times 3 \times 1 = 3$   
 $\frac{3}{\quad} \quad \frac{2 \text{ or } 4}{\quad} \leftarrow \text{Case ② } 1 \times 3 \times 2 = 6$   
 $\frac{4}{\quad} \quad \frac{2}{\quad} \leftarrow \text{Case ③ } 1 \times 3 \times 1 = 3$   
 $\frac{5}{\quad} \quad \frac{2 \text{ or } 4}{\quad} \leftarrow \text{Case ④ } 1 \times 3 \times 2 = 6$   
18 possibilities

b)  $\frac{B}{\quad} \quad \frac{A, E, U}{\quad} \leftarrow \text{Case ① } 1 \times 4 \times 3 \times 3 = 36$   
 $\frac{E}{\quad} \quad \frac{A, U}{\quad} \leftarrow \text{Case ② } 1 \times 4 \times 3 \times 2 = 24$

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60 possibilities

p. 526  
19) 3000 to 8999 inclusive, no 7's

$$\frac{5}{\uparrow} \cdot \frac{9}{\uparrow \text{ not } 7} \cdot \frac{9}{\nearrow} \cdot \frac{9}{\nearrow} = \boxed{3645}$$

(3 to 8,  
not 7)

p. 526  
20) a)  $\frac{26}{L} \cdot \frac{10}{D} \cdot \frac{26}{L} \cdot \frac{10}{D} \cdot \frac{26}{L} \cdot \frac{10}{D}$

$= \boxed{17\,576\,000}$  possible postal codes

p.526

$$22c) {}_nP_3 = 4({}_{n-1}P_2)$$

$$\frac{n!}{(n-3)!} = 4 \frac{(n-1)!}{(n-1-2)!}$$

$$\frac{n!}{(n-3)!} = \frac{4(n-1)!}{(n-3)!}$$

$$n! = 4(n-1)!$$

$$\frac{n!}{(n-1)!} = 4$$

$$\frac{n\cancel{(n-1)!}}{\cancel{(n-1)!}} = 4$$

$$\boxed{n=4}$$

p. 526  
25)One-digit: 1, 3, or 5  $\rightarrow$  3Two-digits: not 0 1, 3, or 5  $\rightarrow$   $4 \times 3$ Three digits: not 0 1, 3, or 5  $\rightarrow$   $4 \times 4 \times 3$ 

0, 1, 2, 3, 4, 5

$$3 + 12 + 48 = \boxed{63}$$

(odd numbers of at most  
three digits using the  
digits 0, 1, 2, 3, 4, 5 with  
no repetitions)

P. 526  
 26) four-digits:

①                      0

② not 0               2

0, 1, 2, 3, 5

$$4 \times 3 \times 2 \times 1 = 24$$

$$3 \times 3 \times 2 \times 1 = 18$$

five-digits:

①                             0

② not 0                      2

$$4 \times 3 \times 2 \times 1 \times 1 = 24$$

$$3 \times 3 \times 2 \times 1 \times 1 = 18$$

$$24 + 18 + 24 + 18 = \boxed{84}$$

(even numbers of at least  
 4 digits using the digits  
 0, 1, 2, 3, 5 with no repetitions)

p. 526  
127) between 1 and 1000, no repeats

one-digit: not 0 or 1 <sup>8</sup>

two digits: not 0 not first digit  $9 \times 9 = 81$

three digits: not 0 not 1st digit not 1st or 2nd digit  $9 \times 9 \times 8 = 648$

$$8 + 81 + 648 = \boxed{737}$$



p. 534

$$\#6d) {}_{n+1}C_{n-1} = 15$$

$$\frac{(n+1)!}{((n+1)-(n-1))! (n-1)!}$$

$$\frac{(n+1)!}{2! (n-1)!} = 15$$

$$\frac{(n+1)!}{(n-1)!} = 30$$

$$(n+1)(n) = 30$$

$$n^2 + n - 30 = 0$$

$$(n+6)(n-5) = 0$$

$$n = -6, 5$$

↑  
extraneous

$$\therefore \boxed{n = 5}$$

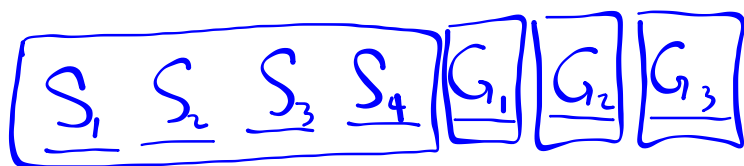
p. 535 #18b) 5 cards, 3 are hearts:

$$\begin{array}{ccc} 13C_3 \times 39C_2 = 286 \times 741 \\ \uparrow \quad \quad \uparrow \\ 3 \text{ hearts} \quad 2 \text{ other} \\ \text{from 13} \quad \text{non-hearts} \end{array} = \boxed{211926}$$

c) 5 cards, 1 is black:

$$\begin{array}{ccc} 26C_1 \times 26C_4 = 26 \times 14950 \\ \uparrow \quad \quad \uparrow \\ 1 \text{ black card} \quad 4 \text{ red cards} \\ \text{from 26} \quad \text{from 26} \end{array} = \boxed{388700}$$

p.535 #19b) 4 different science books  
3 different geography books  
# of arrangements on a shelf  
if science books remain together:



$$4! \times 4! = 24 \times 24 = \boxed{576}$$

# ways to  
arrange the  
four "blocks"

# ways to  
arrange the  
science books within  
each arrangement

p. 535

#20b)

$${}_{20}P_4 = \frac{20!}{16!} = \boxed{116280}$$

↑  
Select 4 paintings from 20  
and arrange them (order matters)