b. $8 \cdot 3 = 24$ ties. Use the multiplicative principle

c. $2 \cdot (7 + 3) + 8 = 42$ outfits.

3.2.6.3.

a. There are 256 3-digit hexadecimals in which the first digit is an E (one for each choice of the remaining digits). Similarly, there are 256 hexadecimals in which the first digit is an F. We want the union of these two disjoint sets, so there are $256 + 256 = 2 \cdot 256 = 512$ 3-digits hexadecimals in which the first digit is either an E or an F.

b. We can select the first digit in 6 ways, digits 2-5 in 16 ways each, and the final digit in 10 ways. Thus there are $6 \cdot 16^4 \cdot 10 = 3932160$ hexadecimals given these restrictions.

c. The number of 4-digit hexadecimals that start with a letter is $6 \cdot 16^3 = 24576$. The number of 4-hexadecimals that end with a numeral is $16^3 \cdot 10 = 40960$. We want all the elements from both these sets. However, both sets include those 4-digit hexadecimals which *both* start with a letter and end with a numeral($6 \cdot 16^2 \cdot 10 = 15360$) so we must subtract these (once). Thus the number of 4-digit hexadecimals starting with a letter or ending with a numeral is:

$24576 + 40960 - 15360 = 50176$

3.2.6.4.

a. $2^8 = 256$ subsets. We need to select yes/no for each of the 8 elements.

b. $2^5 = 32$ subsets. We need to select yes/no for each of the remaining 5 elements.

c. $2^8 - 2^4 = 240$ subsets. We subtract the number of subsets which do *not* contain any odd numbers (2^4-select yes or no for each even element) from the total number of possible subsets.

d. $\binom{4}{1} \cdot 2^4 = 64$ subsets. First pick the even number. Then say yes or no to each of the odd numbers.

3.2.6.5.

a. $\binom{6}{4} = 15$ subsets

b. $\binom{3}{1} = 3$ subsets. We need to select 1 of the 3 remaining elements of S to be in the subset.

c. $\binom{6}{4} = 15$ subsets. All subsets of cardinality 4 must contain at least one odd number.

d. $\binom{3}{1} = 3$ subsets. Select 1 of the 3 even numbers. The remaining 3 odd numbers of S must all be in the set.

3.2.6.7.

a. We can think of each row as a 4-bit string of weight 2 (since of the 4 coins,