7.4 16 (a)[3pts] Since there are 4 different suits, there are 4 different cards that are 9 and 4 different cards that are 10. Since a card cannot be both a 9 and a 10 at the same time, these are mutually exclusive events. So P(9 or 10) = P(9) + P(10) = 4/52 + 4/52 = 8/52 = 2/13.

(b)[3pts] Half of the cards are red, so there are 52/2 =26 red cards. 4 of the cards are 3, and two of the 3s are red. P(red or 3) = P(red) +P(3) - P(red 3) = 26/52 + 4/52 -2/52 = 28/52 = 7/13.

(c)[3pts] Since a card cannot be both a 9 and a 10 at the same time, these are mutually exclusive events. There are 4 nines, and two of the tens are black. P(9 or black 10) = P(9) +P(black 10) = 4/52 + 2/52 = 6/52 = 3/26.

(d)[3pts] Hearts are red, not black, so these events are mutually exclusive. One fourth of the cards are hearts, so there are 52/4 = 13 red cards. Half of the cards are black, so there are 52/2 = 26 black cards. P(heart or black) = P(heart) + P(black) = 13/52 + 26/52 = 39/52 = 3/4

(e)[3pts] There are three kinds of face cards (king, queen, jack) in 4 suits, for a total of $3 \times 4 = 12$ face cards. Three of these are diamonds. One fourth of all cards are diamonds, so there are 52/4 = 13 diamonds total. P(face card or diamond) = P(face card) + P(diamond) - P(face card and diamond) = 12/52 + 13/52 - 3/52 = 22/52 = 11/26.

7.4 20 (a)[3pts] There are 5 different possibilities for the first slip, and then 4 different ones for the second slip. The total number of ordered pairs in the sample space is $5 \times 4 = 20$. There are two ways that the sum of the two slips could be 9: if the first is 5 and the second is 4, or the first is 4 and the second is 5. We'll write these as (5,4) and (4,5). So P(sum is 9) = 2/20 = 1/10.

(b)[3pts] To have a sum of 5 or less, we could have (1,2), (1,3), (1,4), (2,1), (2,3), (3,1), (3,2), or (4,1). That's 8 different ways. So P(sum is 5 or less) = 8/20 = 2/5.

(c)[3pts] There are four different ways that the first number could be a 2: (2,1), (2,3), (2,4), or (2,5). There are also four different ways that the sum could be six: (1,5), (2,4), (4,2), (5,1). There is an overlap of 1: (2,4). So P(first number is 2 or sum is 6) = P(first number is 2) +P(sum is 6) - P(first number is 2 and sum is 6) = 4/20 + 4/20 - 1/20 = 7/20.

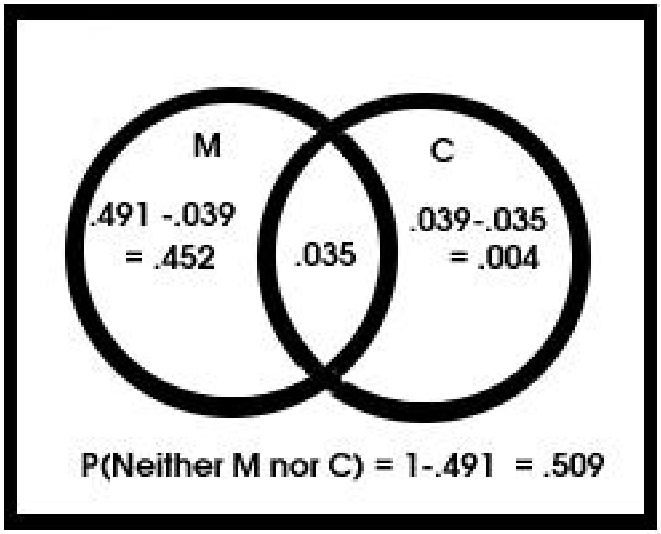
7.4 46 [5pts] The possible s are all between 0 and 1, which is good, but when we add them, we get : 1/3 + 1/4 + 1/6 + 1/8 + 1/10 = 117/120 <1. Since they don't sum to 1, this is not a possible assignment for probabilities.

7.4 56 (a)[3pts] P(Less than \$25) = .07 + .18 = .25

(b)[3pts] P(More than \$24.99) = 1 - P(Less than \$25) = 1- .25 = .75

(c)[3pts] P(Between \$50 and \$199.99) = .16 + .11 +.09 = .36

7.4 60 You can do this by making a Venn diagram, and filling numbers into the appropriate places:



Then you can add the amounts in the appropriate regions together to get the answers:

(a)[3pts] $P(C') = 1 - P(C) = 1 - .039 = .961$

(b)[3pts] $P(M) = .452 + .035 = .487$

(c)[3pts] $P(M') = 1 - P(M) = 1 - .487 = .513$

(d)[3pts] $P(M' \cap C') = .509$

(e)[3pts] $P(C \cap M') = .004$

(f)[3pts] $P(C \cup M') = P(C) + P(M') - P(C \cap M') = .039 + .513 - .004 = .548$

Section 7.5

7.5 10 [6pts] P(second card is an ace | first card is not an ace) = 4/51 because there are 4 aces that we could possibly pick, and 51 cards left to pick from.

7.5 12 [6pts] P(ace first and 4 second) = $(4/52) \times (4/51) = 4/663$

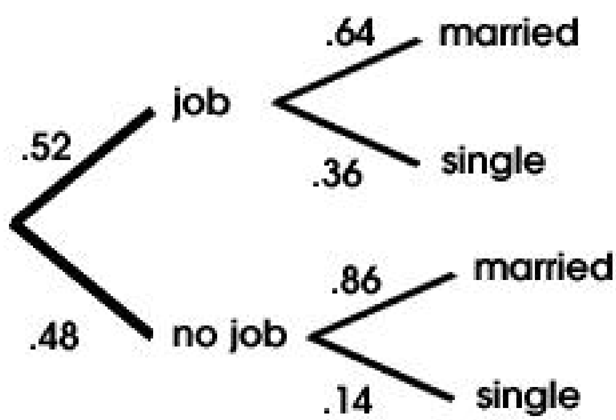
P(4 first and ace second) = $(4/52) \times (4/51) = 4/663$

Since when we pick the cards either we'll pick the ace first or the 4 first, these are mutually exclusive events. We can add the two probabilities. P(picking an ace and a 4) = $4/663 + 4/663 = 8/663$

7.5 22 [12pts] For a two child family, our sample space is: M - M, M - F, F - M, F - F.
P(each child is the same sex) = 2/4
P(each child is the same sex | at most one male) = 1/3
Since $1/3 \neq 2/4$, they are not independent in a two child family.

For a three child family, our sample space is: M - M - M, M - M - F, M - F - M, M - F - F, F- M - M, F - M - F, F - F - M, F - F - F.
P(each child is the same sex) = 2/8
P(each child is the same sex | at most one male) = 1/4
Since 2/8 = 1/4, they are independent in a three child family.

7.5 32 [8pts] For simplicity, let's call W the event "withdraw cash from the ATM", and C the event "check account balance at ATM". To calculate the conditional probability $P(C|W)$, we need to know $P(C \cap W)$.
$P(C \cup W) = P(C) + P(W)$ - $P(C \cap W)$
.96 = .92 + .32 - $P(C \cap W)$
$P(C \cap W) = .28$.
Then, $P(C|W) = P(C \cap W)/P(W)$ = .28 / .32 = .875
The probability that she uses the ATM to get cash given she checked her account balance is .875.
7.5 62 For this, we can see it best by drawing a tree diagram.
Note: For the purposes of this problem, "job" means "work outside of the home".



(a)[6pts] P(married) = P(job and married) + P(no job and married) = .52(.64) + .48(.86) = .3328 + .4128 = .7456
(b)[6pts] P(job and single) = .52(.36) = .1872