1. The negation of an “and” statement is the disjunction of the negations. Here the first part of the conjunction is a “for all” statement, and its negation is the “there exits” statement of the negation. The second part is a “there exits” statement, so its negation is the “for all” statement of the negation. Summing up (so to speak), to negate the original statement, change the “all”s to “some”s and vice-versa, change “work” to “not work”, “and” to “or”, and finally “are” to “are not.” That gives (e).

2. The negation of an implication is the conjunction of the antecedent and the negation of the consequent. That gives (d).

3. The number of men with children plus the number of men with dogs minus the number with both equals the number of men with either children or dogs. This number can’t be more than the total number of men, so letting $X$ denote the number of men with both, you get

$$72 + 83 - X \leq 124.$$

Solving this inequality for $X$, you get

$$155 - X \leq 124$$

$$155 \leq 124 + X$$

$$155 - 124 \leq X,$$

in other words, $X \geq 31$. On the other hand, the number of men with both can’t be more than the number with children, so $X \leq 72$ and the answer is (d).

4. Quoting from the textbook, “If we associate to an interval estimate the probability that the parameter actually lies in the interval ... The probability associated with [the] interval is called the confidence level...” (emphasis in the text). Here the interval is 31,320 to 324,108 and the
parameter is the average yearly salary of those doing your job. Sounds to me like (d) is the correct answer.

5. If you read page 92 of the textbook, you see that (a) and (c) are definitely true. Also, you could test it using chi-square. Try polling 100 friends and neighbors if they gardened as described or not. The degree of freedom $d = 1$, you could set $\alpha = .05$, etc... For all we know, the figure may be incorrect, so (e) could be true. That leaves, via a process of elimination, only (d) as the possible answer. But I don’t see any a priori reason why it must be false (any more than (e) must be true). Hmmm...

6. Not much to say here except that a value of $\chi^2$ more than, not less than, the corresponding number in table 6.1 means to reject the null hypothesis. Answer (d) again. Got that? (d), not (e). Hello... is this thing on?

7. Since (d) and (e) are clearly different, it must be one of them. The contrapositive of an implication is logically equivalent to the implication. The contrapositive is formed by reversing the antecedent and consequent, and negating both. That would be (d), so (e) is not logically equivalent to the original statement.

8. Conjunctions are “and” statements. I emphasize statements here since right there on page 110 it says opinions aren’t logical statements, so can’t be conjunctions (or disjunctions, or implications ...). So none of these are conjunctions, and moreover, (a) isn’t grammatically correct; the sun shines brightly. Harrumph!

9. This looks like an implication to me. I have to say (d) looks right.

10. In case you’ve forgotten (or never knew!), you compute $\chi^2$ by adding the squares of the difference between expected and observed divided by expected. Here

$$
\chi^2 = \frac{(123 - 105)^2}{105} + \frac{(86 - 76)^2}{86} + \frac{(56 - 48)^2}{56} = 5.391...
$$
Answer (a) is correct.

11. Statistics (inferential or not) won’t prove anything. Answer (b) here.

12. The corresponding number in table 6.1 is 11.143. Any $\chi^2$ larger than that indicates we should reject the null hypothesis, so (e) is false.

13. Like Donny’s stereo being too loud, (d) is an opinion, not a logical statement which is either true or false.

14. To negate a “for all” statement, change the “for all” to “there exists” and negate what’s inside. (Didn’t I say this already?) The correct answer is thus (b).

15. Look at the solution to number 2 above. This one is the same thing (right?). Looks like (d) is a winner again.

16. The number who saw The Messenger plus the number who saw Do the Right Thing minus the number who saw both equals the number who saw either, which is 133. From this you see that $181 - 133 = 48$ saw both. In other words, of the 78 who saw The Messenger, 48 also saw Do the Right Thing, which leaves 30 who didn’t. That’s answer (b).

17. Hmmm. I don’t know about you, but I spell it “withdrawals.” Of course, I never make spelling mistakes on my exams. (That’s self-deprecating sarcasm for the humor-impaired.)

At any rate, reasoning as in number 3 above, the number who did both must be at least $83 + 71 - 140 = 154 - 140 = 14$ and not more than the number who made one of those “withdrawals” [sic]. Once more, the correct answer is (d).

18. As Mark Twain so famously said, “There are lies, damn lies, and statistics.” Don’t ever let someone convince you they can prove anything; they can only suggest certain hypotheses are
true or false. Two thumbs up - way up - for (b).