Homework due April 1

Assigned exercises:

From linked supplement: 42, 47, 49, 55, 57.

From Ch.4, OpenStax book, pg. 284-292, ex. 28, 31, 32, 35, 71, 73, 74(b,c,d,e), 81, 83, 84, ~~85~~. (total=15 exercise numbers)

Graded exercises:

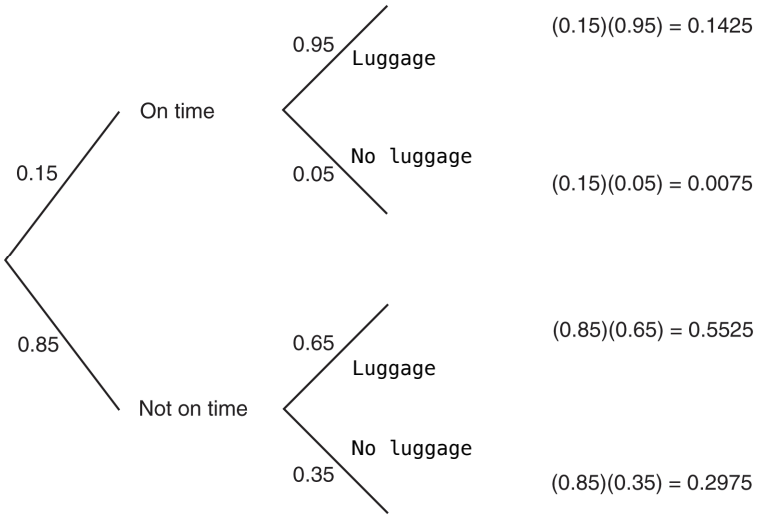
From linked supplement: 47, 49.

From Ch.4, OpenStax book: 32, 35, 73.

Total (maximum) possible points = 20.
3 pt for each of 5 graded problems, plus 5 for completion of the rest.
-0.5 pt for each (ungraded) missing problem; if a graded problem is missing, student loses the points allotted to it.

Exercises from linked supplement

(47) One way to organize the given information is via a tree diagram:



(a) No, they are not independent. Independence would require:
P(Luggage) = P(Luggage | On time) = P(Luggage | Not on time)
Here P(Luggage | On time) = 0.95, whereas P(Luggage | Not on time) = 0.65.

(b) P(Luggage) = P(On time and Luggage) + P(Not on time and Luggage)
From the tree, we get: P(Luggage) = (0.15)(0.95) + (0.85)(0.65)
$\boxed{= 0.695}$ (Answer)

Grade: 1 pt. for (a), 2 pt. for (b).
For (a): answer must include argument comparing conditional probabilities of luggage for on time vs not on time.
For (b): 1 pt = correct tree diagram (need not include every detail in mine).
1 pt = correct computations.
If student doesn't use a tree diagram, solution must show clear steps on how P(Luggage) was computed.

(49) This question is asking for the conditional probability: P(Not on time | No luggage)
Using the conditional probability formula, together with the tree diagram shown above:

$$\text{P(Not on time | No luggage)} = \frac{\text{P(Not on time and No luggage)}}{\text{P(No luggage)}} = \frac{(0.85)(0.35)}{1-0.695}$$

$$\boxed{= 0.9754} \text{ (Answer)}$$

Grade:
1 pt = know/show/understand that this Q is about P(Not on time | No luggage)
1 pt = know/show correct conditional probability formula needed here.
1 pt = compute correct answer.

Exercises from Ch.4, OpenStax

(32) This is asking for the expected value:

$$E(X) = \sum x \cdot P(x) = (1)(0.1)+(2)(0.05)+(3)(0.1)+(4)(0.15)+(5)(0.3)+(6)(0.2)+(7)(0.1)$$

Answer: $\boxed{E(X) = 4.5 \text{ years}}$

Grade:
2 pt = show correct numbers plugged into $E(X)$ formula.
1 pt = compute correct answer.

(35) Given info: If I draw a face card from a standard deck of 52 playing cards, I win \$30. Otherwise, I pay \$2.

Let X = the amount I win (a negative amount corresponds to loss).

Since there are 12 face cards out of 52, the values of X and their probability is:

X (in \$)	30	-2
$P(x)$	12/52	40/52

Therefore, $E(X) = \sum x \cdot P(x) = 30\left(\frac{12}{52}\right) - 2\left(\frac{40}{52}\right)$ $\boxed{= \$5.38}$

Grade:
1+1 pt = show correct values of X + corresponding values of $P(X)$.
1 pt = compute correct answer.

(73) (a) Since all the probabilities sum up to 1, the missing probability is:

$$1 - (0.3 + 0.2 + 0.4) \quad \boxed{= 0.1} \text{ (Answer)}$$

(b) $E(X) = \sum x \cdot P(x) = 0(0.3) + 1(0.2) + 2(0.1) + 3(0.4) \quad \boxed{= 1.6}$ (Answer)

Grade: 1.5 pt. each for (a) and (b).
For each case: 1 pt = correct answer; 0.5 pt = show some step(s) or reason(s)