1.a) log-odds = −3+0.8×2+1.5×0 = −3+1.6 = −1.4

Odds = e−1.4 = 0.25

Likelihood of passing the exam =

1.b) Updated log-odds = −3+0.8×2+1.5×1 = −3+1.6+1.5 = 0.1

Updated Odds = e 0.1 = 1.10

Updated Likelihood of passing the exam =

1.c) Yes the answer would definitely change because “Hours\_studied” can be considered as a variable in the current formula. Also it has a positive co-efficient of 0.8 therefore studying more would increase the probability of passing and studying less would decrease it.

1.d) Attending the Review\_Session will raise the log\_odds by +1.5 (Review\_Session = 1) since the Review\_Session coefficient (1.5) is positive. It will increase the chances of passing the test by about 4.5 (e1.5) times, assuming that the amount of time spent studying stays the same.

1.e) Since Hours\_Studied's coefficient (0.8) is positive, the log\_odds will rise by +0.8 for every extra hour of study, the odds will rise by roughly 2.23 (e0.8) times, and the likelihood of passing the test will rise as well (assuming Review\_Session remains constant at 0 or 1).

1.f) When Hours\_Studied = 0 and Review\_Session = 0, the log-odds of passing the exam is -3.

Odds = e -3 = 0.05

Likelihood of passing the exam =

Therefore, a student's chances of passing the test are extremely low,roughly 4.7% if they do not study or attend the review session.

1.g) When Hours\_Studied = 8,

Likelihood of passing the exam Without review session (Review\_Session = 0):

log-odds = −3+0.8×8+1.5×0 = −3+6.4 = 3.4

Odds = e 3.4 = 29.96

Likelihood of passing the exam =

Likelihood of passing the exam Without review session (Review\_Session = 1):

log-odds = −3+0.8×8+1.5×0 = −3+6.4+1.5 = 4.9

Odds = e 3.4 = 134.29

Likelihood of passing the exam =

Attending the review session raises the chance of passing from 96.7% to 99.3%, but the difference is only 2.6%.

I wouldn't recommend someone who spent eight hours studying to go to review sessions because the difference is negligible. However, they can go to the review sessions if they want to increase their chances of passing.

1.h) Students with lower chances of passing i.e. those who put in less study time would gain the most from the review sessions. Attending a review session raises the log\_odds by +1.5, boosting the odds and thus the student's likelihood of passing the test.

Link for the answers 1.b and 2 : <https://github.com/Sumanth457/is7332025/blob/main/data-mining-project-repo/03102025_CW/IS733_CW03102025.ipynb>