Q2

$\max Z = 3x_1 + x_2$

$s.t. \Rightarrow 4x_1 + x_2 \leq 7$ —①

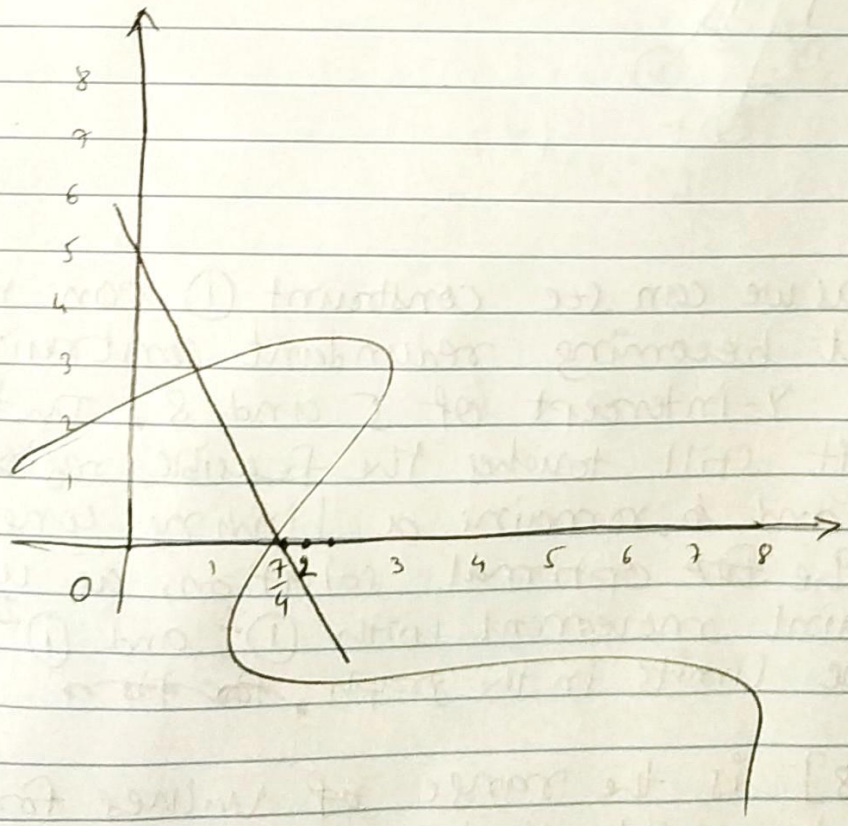
$5x_1 + 2x_2 \leq 10$ —②

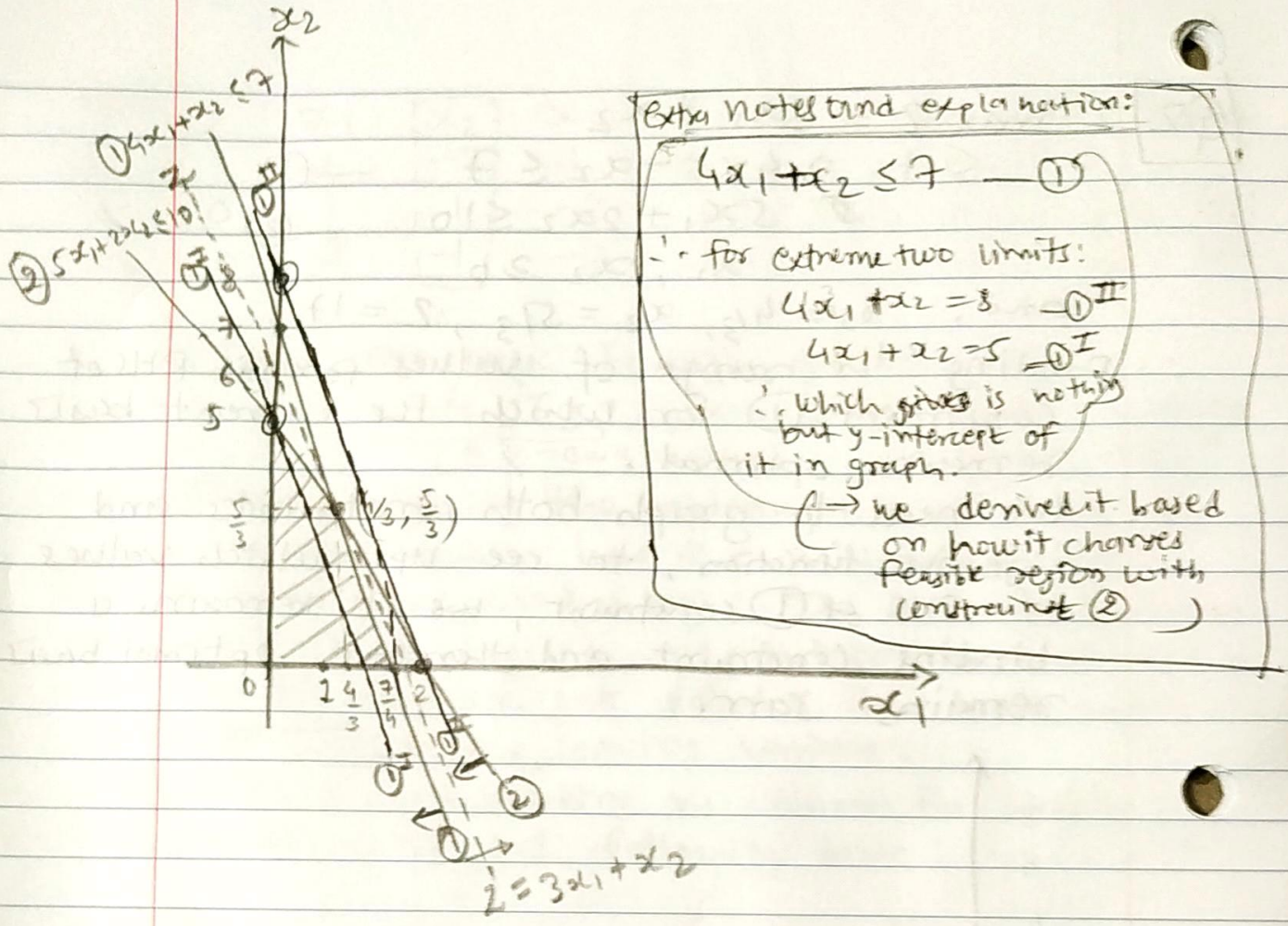
$x_1, x_2 \geq 0$

and, $x_1 = 4/3$, $x_2 = 5/3$, $Z = 17/3$

∴ Finding the range of values for the RHS of constraint ① for which the current basis remains optimal.

∴ We need to graph both constraints and objective function, to see upto which values of RHS of ① constraint, it remains a binding constraint and therefore optimal basis remains same.





Extra notes and explanation:

$4x_1 + x_2 \leq 7$ — ①

∴ for extreme two limits:

$4x_1 + x_2 = 8$ — $①^{II}$

$4x_1 + x_2 = 5$ — $①^{I}$

∴ which gives is nothing but y-intercept of it in graph.

(→ we derived it based on how it changes feasible region with constraint ②)

→ Now, as we can see constraint ① can move without becoming redundant constraint until it has Y-intercept of 5 and 8. In this case, it still touches the feasible region extreme points and is remains a binding constraint for the ~~for~~ optimal solution, as we saw constraint movement with $①^{I}$ and $①^{II}$ for extreme limits in the graph, ~~for them~~

Answer ∴ [5, 8] is the range of values for the right-hand side of the first constraint for which the current bayis remains optimal.