Check your understanding

37. Continuing the previous example, suppose we want to set up a triple integral over the region defined by the inequalities $x^2 \leq y \leq 1$ and $0 \leq z \leq 1 - y$ in the order $dx\,dy\,dz$. What are the y limits?

    (a) $0 \leq y \leq 1$.

    (b) $x^2 \leq y \leq 1$.

    (c) $0 \leq y \leq 1 - z$.

    (d) $x^2 \leq y \leq 1 - z$.

    Answer: (c).

    Explanation: The inequality $x^2 \leq y$ tells us that $0 \leq y$, but nothing more since x is not fixed. The inequality $z \leq 1 - y$ tells us that $y \leq 1 - z$, and z is fixed. The inequality $y \leq 1$ is redundant because we already know that $y \leq 1 - z$, and this inequality is stronger than $y \leq 1$ because $1 - z \leq 1$ since $0 \leq z$.