Unit I. Lessons distribution and self-assesment questions

- Lesson 1. Sections 1 to 2.3.

    1. If f is continuous, then its derivative will also be continuous. True or false?
    2. A discontinuous function can have a primitive, but not a derivative. Is it correct?
    3. Is $f(x) = \lfloor x \rfloor$ derivable? Does it have a primitive? If it does, where?
    4. Given two partitions P and P', is it always true that either $P \subset P'$ or $P' \subset P$?
    5. What is the relation between the Darboux sums corresponding to a partition P?
    6. The Riemann integral is the area between the function and the x-axis, hence its value must be positive. Is it correct?

- Lesson 2. Sections 2.4 to 4.1.

    1. Is the fractional part function integrable on any bounded interval?
    2. Let $[a, b]$ be an interval. The expression $\displaystyle\int_b^a f(x)\,dx$ does not make sense, since $b > a$. Is it correct?
    3. If f and g satisfy $f \leq g$ on I, what is the relation between their definite integrals?
    4. Can we apply the intermediate value theorem to the floor function?
    5. If f has jump discontinuities, will its integral function be continuous ?

- Lesson 3. Sections 4.2 to 6.

    1. If f is continuous, what relation exists between f and the derivative of its integral function F?
    2. Why do we say that $f(x) = \dfrac{\sin x}{x}$ has no primitive on $[1, 3]$, if f es continuous?
    3. The Barrow rule is applied also to continuous functions. True or false?
    4. Can the integral of an unbounded function exist?
    5. Can the integral of a bounded function on an unbounded interval exist?