Rectifiability and pointwise differentiability of higher order

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For a real valued functions on Euclidean space, the following three conditions are equivalent:

(i) it is Lebesgue measurable,

(ii) it is approximately continuous Lebesgue almost everywhere,

(iii) outside a set of arbitrarily small Lebesgue measure, it agrees with a continuous function.

We will survey the theory that emerges when replacing the continuity condition with that of being k times continuously differentiable. Convex functions (for $k = 2$) and k times weakly differentiable functions are examples of functions satisfying the resulting conditions.