

Learning objectives for test 2

1. Given a function and an interval in its domain, calculate the average rate of change of the function on that interval.
2. Calculate derivatives of functions. We have rules to differentiate the following types of functions:
 - power functions,
 - constant multiples of power functions,
 - sums of constant multiples of power functions,
 - any function that can be expressed as one of the above types of functions raised to a power (using the general power rule).
 - any combination of sums and constant multiples of the above functions (see for example section 1.6 exercises 25, 31, 33, 35)
3. Given a function or the values of the function and its derivative at a point, use the tangent line approximation to approximate the value of the function at another point.
4. Given a function f (e.g. a polynomial, rational function, or piecewise-defined function) and a value a of the independent variable x , determine whether the $\lim_{x \rightarrow a} f(x)$ exists, and find its value. Also, calculate $\lim_{x \rightarrow \infty} f(x)$.
5. Determine whether or not a function is continuous and differentiable at a point a .
6. Use information about the first and second derivatives of a function to determine characteristics of its graph, including intervals of increase, decrease, concavity, local minima and maxima, inflection points.