The aim of this study was to develop flame retardant, crease resistance and air permeability properties of cotton fabrics by applying different polycarboxilic acids and Al$_2$O$_3$ nanoparticles. In the study, butanetetra carboxylic acid (BTCA) and maleic acid (MA) catalyzed by sodium hypophosphite were used to embed Al$_2$O$_3$ nanoparticles on the surface of cotton fabric. The fabrics cross-linked by polycarboxylic acids and treated with Al$_2$O$_3$ nanoparticles were tested to investigate flame retardancy, resistance against creasing and air permeability properties before and after repeated home laundering. The strength of the all treated fabrics was also investigated. The presence of Al$_2$O$_3$ nanoparticles on the fabrics and cross-linked cellulose structure were investigated by SEM and FT-IR spectroscopy, respectively. In conclusion, it was observed that flame retardancy of the fabric increased with increasing BTCA amount as it decreased with the increasing in MA concentration. After Al$_2$O$_3$ nanoparticles application, flame retardancy decreased compared to that of fabrics cross-linked. However, flame retardancy and also air permeability of the fabrics was increased with the increasing in Al$_2$O$_3$ concentration from 0.1% to 0.5%.