(1) Show, according to the formal definition of limit, that if

$$a_n = \frac{2n^2 + n}{n^2 + 2n - 10}$$

then $\lim_{n\to\infty} a_n = 2$.

(2) Prove the subtriangle inequality: $\big|\,|x| - |y|\,\big| \le |x - y|$.

(3) Prove, according to the formal definition of limit, that if $\lim_{n\to\infty} a_n = L$ and $\lim_{n\to\infty} b_n = M$ then $\lim_{n\to\infty}(a_n + b_n) = L + M$. (In words, the limit of the sum is the sum of the limits.) Hint: the triangle inequality implies that $|(a_n + b_n) - (L + M)| \le |a_n - L| + |b_n - M|$.