

Question #15291 Is there a number 'a' such that $\lim_{x \rightarrow -2} \frac{3x^2 + ax + a + 3}{x^2 + x - 2}$ exists? For such 'a' (if any), find $\lim_{x \rightarrow -2} \frac{3x^2 + ax + a + 3}{x^2 + x - 21}$

Solution.. It is obvious that denominator tends to zero, as $x \rightarrow -2$, the numerator tends to some finite number b for any a . In order the limit to exist b must equal zero. So, one gets the equality $12 - 2a + a + 3 = 0$, hence $a = 15$.

Next, find our limit $\lim_{x \rightarrow -2} \frac{3x^2 + 15x + 18}{x^2 + x - 2} = \lim_{x \rightarrow -2} \frac{3(x + 3)}{x - 1} = -1$.

Answer. $a = 15$, the limit is -1 .