1. Simplify the following algebraic expressions by carrying out the indicated operations.

a) $\dfrac{x}{x+9} + \dfrac{3x+27}{x^2+18x+81}$

b) $\dfrac{x+5}{x^2-16} + \dfrac{3}{x-4}$

c) $\dfrac{a^2-1}{a^2+a-2} \div \dfrac{2a+2}{6a^2+12a}$

2. Simplify the following rational expressions.

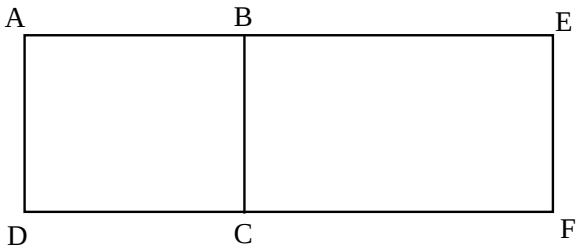
a) $\dfrac{c^2-4}{c^2+c-6}$

b) $\dfrac{a^3b+4a^2b-ab-4b}{a^2-1}$

c) $\dfrac{6ab-15a+12b-30}{6b-15}$

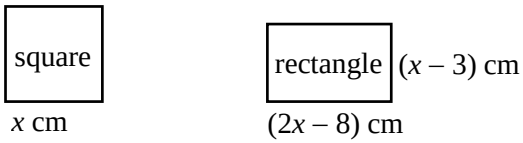
d) $\dfrac{(x-1)^2-9}{x-4}$

3. Rectangles ABCD and BEFC below have side BC in common.
The lengths of their bases and their heights can be represented by binomials. This therefore means that the area of each rectangle is represented by a trinomial as follows:



- The area of rectangle ABCD is represented by the trinomial $6x^2 + 17x + 5$.
- The area of rectangle BEFC is represented by the trinomial $8x^2 + 14x - 15$.
  What binomial represents the length of side BC?

4. The following square and rectangle have the same area.
What are the actual dimensions of the rectangle?



5. The length of the sides of rectangle ABCD below can be represented by binomials.
The area of this rectangle is then represented by the trinomial $5x^2 + 38x - 63$.
In addition, the length of diagonal AC of this rectangle is 52 cm.
What is the numerical perimeter of rectangle ABCD in centimetres?