

Simplify the following rational expression.  $\frac{3x^2-7x-20}{x-9} \cdot \frac{x^2-12x+27}{x-4}$

$$\begin{aligned}\frac{3x^2-7x-20}{x-9} \cdot \frac{x^2-12x+27}{x-4} &= \frac{(3x+5)(x-4)}{x-9} \cdot \frac{(x-9)(x-3)}{x-4} \\ &= \frac{(3x+5)\cancel{(x-4)}}{\cancel{(x-9)}} \cdot \frac{\cancel{(x-9)}(x-3)}{\cancel{(x-4)}} \\ &= (3x+5)(x-3) = 3x^2-4x-15\end{aligned}$$