Simplify the rational expression. $\dfrac{y^2 - 3y + 9}{y^3 + 27}$

$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$$\dfrac{y^2 - 3y + 9}{y^3 + 27} = \dfrac{y^2 - 3y + 9}{(y+3)(y^2 - 3y + 9)}$$

$$= \dfrac{(y^2 - 3y + 9)}{(y+3)(y^2 - 3y + 9)} = \dfrac{1}{(y+3)} \quad \textit{whenever } y^2 - 3y + 9 \neq 0 \textit{ and } y \neq -3.$$

$\textit{Note: } y^2 - 3y + 9 = 0 \textit{ when } y = \dfrac{3 \pm \sqrt{9 - 4(1)(9)}}{2} = \dfrac{3 \pm \sqrt{-27}}{2} = \dfrac{3 \pm 3i}{2}$