AEM questions are taken from past exam papers - they have been carefully chosen to represent a typical exam question at each level of difficulty. If you can do these questions, you’re ready to move onto past papers for this topic.

APPRENTICE

State the range of \( f(x) = 3 - e^{1-2x} \)

a. if the domain of \( f(x) \) is \( x \in \mathbb{R} \)
b. if the domain of \( f(x) \) is \( x \geq 0 \)

EXPERT

\( g(x) = \frac{x}{x + 3} + \frac{3(2x + 1)}{x^2 + x - 6}, \quad x \geq 0 \)

a. Show that \( g(x) = \frac{x + 1}{x - 2}, \quad x \geq 0 \)
b. Find the range of \( g(x) \)

MASTER

A function \( f(x) \) is defined as \( f(x) = \begin{cases} 
-x & \text{if } -4 \leq x \leq 0 \\
x^2 & \text{if } 0 \leq x < 2 \\
10 - 3x & \text{if } 2 \leq x < 4 
\end{cases} \)

a. The equation \( f(x) = k \) has one solution. State the range of possible values of \( k \).
b. State the range of \( f(x) \)