b. Define $G: R \to R$ by the rule $G(x) = 3x - 2$ for all real numbers x. Is G onto

If $G: R \to R$ is the function defined by the rule $G(x) = 3x - 2$ for all real numbers x, then G is onto.

Proof:

Let $y \in R$ [we must show that $\exists x$ in R such that $G(x) = y$.] Let $x = (y+2)/3$. Then x is a real number since sums and quotients (other than by 0) of real numbers are real numbers. It follows that

$G(x) = G\left(\frac{y+2}{3}\right)$ by substitution

$= 3\left(\frac{y+2}{3}\right) - 2$ by def. of g

$= (y+2) - 2 = y$ by basic algebra

This was what was to be shown.

14. $f(x) = \frac{2x+1}{x}$, for all real numbers $x \neq 0$.

one to one?

If the function $f: R \to R$ is defined by the rule $f(x) = \frac{2x+1}{x}$, for all real numbers x, except 0, then f is one to one.

Suppose x_1 and x_2 are real numbers such that $f(x_1) = f(x_2)$. [We must show that $x_1 = x_2$]