Exponentials, CS-24, Dr. Ostheimer

We set up some notation: Let $f : \mathbf{R} \to \mathbf{R}$ be given by $f(x) = 3^x$.

And now for your questions:

(1) What is the domain of f?

(2) What is the codomain of f?

(3) Is f one-to-one?

(4) Is f onto?

(5) Is f a one-to-one correspondence? (Hint: no.)

(6) Modify the codomain of f to make a new function which we will call g such that g is a one-to-one correspondence. (You are not allowed to change the domain or the formula for f.)

Let g^{-1} denote the inverse of g.

(1) Compute $g(x)$ for $x = 0, 1, 2, 3$.

(2) Compute $g^{-1}(x)$ for $x = 1, 3, 9, 27, \ldots$.

Please turn over.

Have you figured out that $g^{-1}(x) = \log_3(x)$? Now that you know:

(1) Rewrite the equation $g^{-1}(g(x)) = x$ using logs and exponents.

(2) Rewrite the equation $g(g^{-1}(x)) = x$ using logs and exponents.