

(2.) (5 points) Suppose f is a function that satisfies the following three properties:

1. f is a power function.
2. $f(1) = -7$.
3. $f(2x) = 8f(x)$, for every x .

Determine the exact formula for $f(x)$.

$$\begin{aligned}
 f(x) &= kx^p \\
 k &= f(1) = -7 \\
 f(2x) &= (-7)2^p x^p, 8f(x) = 8(-7)x^p \\
 2^p &= 8, p = 3 \\
 \boxed{f(x) &= -7x^3}
 \end{aligned}$$

(3.) (6 points) Let $f(x) = \frac{x^2-1}{x-1}$, and let $g(x) = x + 1$.

(a) Are f and g the same function? Why or why not?

No. Although f and g agree whenever $x \neq 1$, the two functions do not agree when $x = 1$.

(b) Let h be the function whose output is always 4, except that $h(-1)$ is undefined. Write a formula for $h(x)$ as a rational function.

$$h(x) = \frac{4(x+1)}{x+1}$$