How to find an Inverse Function

Inverse Function – A function derived from an original function in which each input becomes an output and each output becomes an input for the function.

Example 1: Inverse Relations:
Find the inverse of the relation:
{(1,2), (2,4), (7, -2), (9, -3), (10,6)}
Solution:
Interchange each x and y value and rewrite the relation:
{(2,1), (4,2), (-2,7), (-3,9), (6,10)}

Example 2: Inverse Functions
Find the inverse of the following function:
f(x) = 8x + 9
Solution:
Step 1: Replace f(x) with y:
y = 8x + 9
Step 2: Interchange x and y:
x = 8y + 9
Step 3: Solve for y (Subtract 9 from each side):
x − 9 = 8y + 9 − 9 → x − 9 = 8y
Step 4: Divide by 8 on each side:
\[
\frac{x-9}{8} = \frac{8y}{8} \rightarrow \frac{x-9}{8} = y
\]
Step 5: Replace y with \( f^{-1}(x) \):
\[
f^{-1}(x) = \frac{x-9}{8}
\]

Practice Problems
Find the inverse of the following functions:
1) \( h(x) = x^2 - 4 \)
2) \( f(x) = \frac{4x-1}{-2x+3} \)
3) \( g(x) = \sqrt{5x - 6} \)

Solutions:
1) \( h^{-1}(x) = \sqrt{x + 4} \)
2) \( f^{-1}(x) = \frac{3x+1}{2x+4} \)
3) \( g^{-1}(x) = \frac{y^2+6}{5} \)