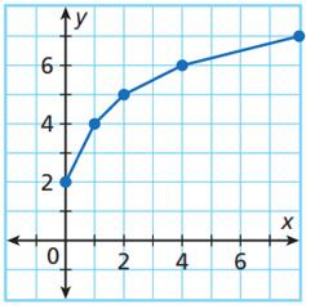
# 7.2: INVERSES OF RELATIONS AND FUNCTIONS

- To graph the inverse relation, reflect each point across the line y = x. This is equivalent to switching the x- and y-values in each ordered pair of the relation.

## Example 1: Graphing Inverse Relations

Graph the relation and connect the points. Then graph the inverse. Identify the domain and range of each relation.




| x | 0 | 1 | 2 | 4 | 8 |
|---|---|---|---|---|---|
| y | 2 | 4 | 5 | 6 | 7 |

| | *Domain* | *Range* |
|---|---|---|
| $f(x)$ | | |
| $f^{-1}(x)$ | | |

## HOW TO FIND THE INVERSE OF A RELATION

- Given $f(x)$. Rewrite it as $y$, then switch $x$ and $y$.
- Solve for $y$.
- Rewrite the computed $y$ as $f^{-1}(x)$.

**Example 2:** Use inverse operations to write the inverse of each function. Then identify the domain and range.

a) $f(x)=3x+4$

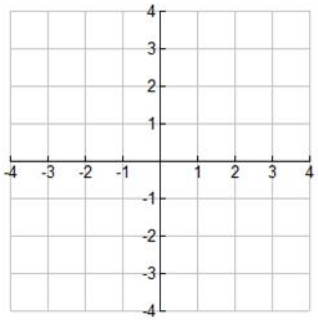
b) $g(x)=x^2-6x+9$

c) $f(x)=\frac{1}{2}(4-3x)$

d) $g(x)=3\sqrt{x+5}-4$

**Example 3:** Find the inverse of the function then write and graph the function and its inverse.

a) $f(x)=3x-2$




**Example 4:** the A clerk needs to price a digital camera returned by a customer. The customer paid a total of $103.14, which included a gift-wrapping charge of $3 and 8% sales tax. What price should the clerk mark on the tag?

**Example 5:** The formula $C=\frac{5}{9}(F-32)$ gives degrees Celsius as a function of degrees Fahrenheit. Find the inverse of this function to convert degrees Celsius to Fahrenheit and use it to find 16°C in degrees Fahrenheit.

**Example 6:** Eliza's auto repair bill includes $175 for parts and $35 per hour for labor. The bill can be expressed as a function of hours $x$ with the function $f(x)=175+35x$. Which statement explains the meaning of the inverse of the function?

Ⓕ Number of hours as a function of the total bill
Ⓖ Total bill as a function of the number of hours
Ⓗ Cost per hour as a function of the total bill
Ⓙ Total bill as a function of the cost per hour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