
Chapter 3 Test

1. Knowledge and Understanding

For the relation, $f(x) = x^2 + 5$, $x \geq 0$,

- (a) determine $f(3)$
- (b) determine $f^{-1}(x)$
- (c) find the domain of the inverse
- (d) sketch the original curve and the inverse on the same axes, labelling matching points on the curves

2. Application

For a fundraising event, a local community club expects to receive \$3000 from corporate sponsorship, plus \$8 from each person who attends the event.

- (a) Create an expression for the expected income in terms of the number of people attending.
- (b) Suggest a reasonable domain and range for the function of total income and justify your selection.
- (c) The publicity committee wants to know how many tickets they need to sell to reach their fundraising goal. Create a function to express the number of people in terms of the expected income. State the domain of this new function.

3. Thinking, Inquiry, Problem Solving

Does a cubic relation, for example, $y = x^3$ or $y = x^3 - x^2 - 6x$, have an inverse?

Clearly state your hypothesis and show how the data you collect justifies your conclusion.

4. Communication

Give details of the relationship between a function and its inverse. Refer to the domain and the line $y = x$, as well as discussing the algebraic relation.

5. Knowledge and Understanding

Solve $-3 \leq \frac{x+2}{5} \leq 1$, $x \in R$, and graph the solution.

6. Application

Using just the given points, sketch the new graph for each relation and label the new points under the given transformation.

- (a) $y = f(x - 3) + 1$
- (b) $y = -3f(2x)$
- (c) $y = f^{-1}(x + 2)$

