Functions, domains and inverses

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A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the worked example, then show each step in the practice questions. Attempt the reasoning and exact calculations by hand. Technology may check a result but cannot replace the written argument.

What you will practise

• Functions and function notation; domains, ranges and inverse functions

Useful starting skills: Year 10 algebra, factorisation, functions, indices, geometry and elementary probability.

A function assigns one output to each allowed input. Its domain is part of its definition; its range contains the outputs actually achieved.

An inverse reverses the input-output relationship. A function needs to be one-to-one on its chosen domain for its inverse relation to be a function.

Worked example

Let f(x)=3 x-5 for all real x. Find $f^{(-1)}(x)$.

Write y=3 x-5

solve x=(y+5)/3

interchange the variable names.

Answer: (x+5)/3.

Try it yourself

Name: _____ Date: _____

1. Find the maximal real domain of $f(x)=\sqrt{(x-4)}$.

2. Find the range of $f(x)=x^2+2$ on $-1 \leq x \leq 3$.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. $[4, \infty)$.

The square-root input must satisfy $x-4 \geq 0$.

2. $[2, 11]$.

The minimum occurs at 0; largest endpoint value is 11.

Curriculum reference: Mathematical Methods Units 1–2 — Functions and function notation; domains, ranges and inverse functions

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