

SECONDARY 5 MATHEMATICS · PRACTICE WORKSHEET · TUTORINMONTREAL.CA

Functions — Properties, Inverses and Piecewise

Name: _____

Date: _____

Concepts

- Algebra — Relations and Functions
- Periodic Functions
- The Inverse of a Function
- The Piecewise Function
- The Role of Parameters a, b, h, and k of a Function in Standard Form

Algebra — Relations and Functions

1. For each rule below, name the family of function it belongs to and give its domain in interval notation (Québec convention).

a) $f(x) = 3\sqrt{x+2} - 1$

b) $g(x) = \frac{4}{x-5} + 2$

c) $h(x) = 2\lfloor x - 1 \rfloor$

d) $k(x) = \log_3(x - 4)$

Periodic Functions

2. The depth of water in a canal lock is a periodic function f of the time t , in minutes, with period 9 min. The readings below cover one full cycle (depths in metres), and the depth varies *linearly* between consecutive readings — so the graph of f is a broken line joining these points, then repeating.

t (min)	0	2	4	6	8
$f(t)$ (m)	3	7	7	1	2

Find $f(20)$, $f(42)$ and $f(-7)$, then state the amplitude of f .

The Inverse of a Function

3. Let $f(x) = \frac{3x-1}{2}$. Find the rule of f^{-1} , then verify your answer by computing $f(f^{-1}(7))$.

The Piecewise Function

4. A function is defined by

$$f(x) = \begin{cases} 2x + 1 & \text{if } x < 2, \\ -x + 9 & \text{if } 2 \leq x \leq 6, \\ 3 & \text{if } x > 6. \end{cases}$$

Evaluate $f(0)$, $f(2)$, $f(6)$ and $f(10)$, give the maximum value of f , and state whether the graph has a break at $x = 2$ (justify).

The Role of Parameters a , b , h and k of a Function in Standard Form

5. The point $(9, 3)$ belongs to the base function $f(x) = \sqrt{x}$. The transformed function is

$$g(x) = -2\sqrt{\frac{1}{3}(x-4)} + 1.$$

Find the coordinates of the image of $(9, 3)$ on the graph of g , and name the transformation produced by each of the four parameters.

Want the harder problems and the worked solutions?

The *Challenge Problems* set and the *Answer Keys* for Functions — Properties, Inverses and Piecewise — with the reasoning written out in full — are available at tutorinmontreal.ca.