

Chapter 1: Functions Review Sheet

- Define the following terms, using correct mathematical notation, if appropriate:
(a) function (b) one-to-one function (c) even function (d) odd function
- Given $f(x) = -x^2 + 2x - 3$ and $g(x) = x - 5$, find the following:
(a) $f\left(-\frac{2}{5}\right)$ (d) The difference quotient or $f(x)$: $\frac{f(x+h) - f(x)}{h}$
(b) $f(x+w)$ (e) $f(g(1))$
(c) $-4g(.5)$
- Find the domain of the following functions in set notation:
(a) $f(x) = x^2 - 2x + 6$ (d) $h(x) = -\sqrt{x+1}$
(b) $g(x) = \frac{x+8}{x-8}$ (e) $y = \frac{\sqrt{x}}{x-5}$
(c) $g(x) = \ln(x+3)$ (f) $c(x) = \sqrt{9-x^2}$
- When does a function have an inverse? Give an example of a function that does not have an inverse function.
- Find the inverse of $f(x) = 3x^3 - 2$
- Are the following functions even, odd, or neither? Justify your answer.
(a) $f(x) = |x| - 3$ (b) $g(x) = -3x\sqrt{2x^2 + 1}$
- Sketch the following functions and state each function's domain and range in interval notation:
(a) $f(x) = \sqrt{x+3} - 1$ (d) $g(x) = (2x-3)^2$
(b) $g(x) = 3[x]$ (e) $y = \ln(x-3)$
(c) $h(x) = 5 - |x+2|$ (f) $p(x) = \sqrt[3]{1-x}$
- Describe, in words, the process we use to find the domain of 2 composed functions.
- Given $f(x) = x^4 - 2x^2$ and $g(x) = \sqrt{2+x}$. Find the domain of $f(g(x))$.

Chapter 4 Review Answers

1a) A **function** is any mapping from one set (the domain) to another (the range) such that each element in the domain is mapped to exactly one element in the range

b) A **one to one function** is any mapping from one set (domain) to another (range) such that each element in the range was mapped from exactly one element in the domain.

c) An **even function** is a function that has the property that $f(-x) = f(x)$ for each element in its domain.

d) An **odd function** is a function that has the property that $f(-x) = -f(x)$ for each element in its domain.

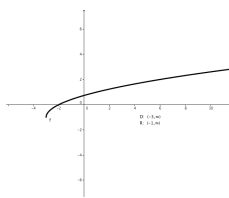
2a) $-\frac{99}{25}$ b) $-x^2 + 2x - 2xw - w^2 - 3 + 2w$ c) 18 d) $-2x - h + 2$ e) - 27

3a) $\{x|x \in R\}$ b) $\{x|x \neq 8\}$ c) $\{x|x > -3\}$ d) $\{x|x \geq -1\}$ e) $\{x|x \geq 0, x \neq 5\}$ f) $\{x|-3 \leq x \leq 3\}$

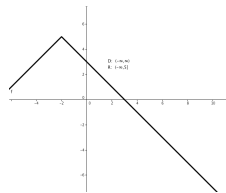
4) A function has an inverse if it is one-to-one. Any function whose graph fails the horizontal line test won't have an inverse.

5) $f^{-1}(x) = \sqrt[3]{\frac{x+2}{3}}$ 6a) Even because $f(-x) = f(x)$ 6b) Odd because $f(-x) = -f(x)$

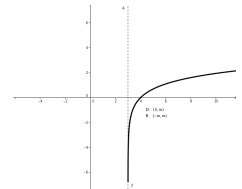
7a)



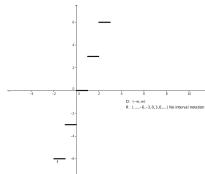
c)



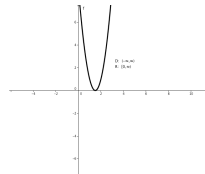
e)



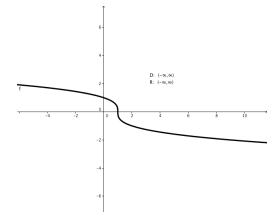
b)



d)



f)



8) First, find the domain of the "inside" function; then, find the domain of the composite function itself to see if you need to restrict the original domain further.

9) $f(g(x)) = x^2 + 2x$, Domain: $[-2, \infty)$