


Objectives You should be able to find the allowed inputs (**domain**) and resulting outputs (**range**) for given functions. Be especially careful with functions that contain fractions and/or square roots. Please use interval notation.

1. Suppose $p(x) = 2\sqrt{x} + 3$.
 - (a) Is there a value of x for which $p(x) = 5$?
 - (b) What is the domain of p ?
 - (c)  What is the range of p ? Explain.
 - (d)  Does the answer to (c) change if $4 \leq x \leq 9$? Explain.
2. Find the domain (and range?) of each of the following functions:
 - (a) $A(x) = 4x^2 + 1$
 - (b) $o(x) = 3 + \sqrt{16 - (x - 3)^2}$
 - (c) $P(x) = \frac{1}{3 + \sqrt{x+1}}$
 - (d) $S(x) = \frac{12x-9}{6-9x}$
3. Find the domain of $g(t) = \frac{2t-4}{\frac{1}{t} - \frac{1}{3t-4}}$.
4. Find the domain of each of the following functions:
 - (a) $f(x) = \frac{1}{\sqrt{2x-5}} + \sqrt{9-3x}$
 - (b) $f(x) = |\sqrt{x} - 2| + |\sqrt{x-2}|$
 - (c) $g(x) = \sqrt{|x| - 2} + \sqrt{|x-3|}$

1 SOLUTIONS

1.

- (a) $x = 1$
- (b) $[0, \infty)$
- (c) $[3, \infty)$
- (d) $[7, 9]$

[Rusczyk(2012), p.6]

2.

- (a) Domain: \mathbb{R} Range: $[1, +\infty)$
- (b) Domain: $[-1, 7]$ Range: $[3, 7]$
- (c) Domain: $[-1, +\infty)$ Range: $(0, 1/3]$
- (d) Domain: All \mathbb{R} except $2/3$ Range: All \mathbb{R} except $-4/3$

[Rusczyk(2012), p.26]

3. $[5/2, 3) \cup (3, +\infty)$ [Rusczyk(2012), p.7]

4.

- (a) $(5/2, 3]$
- (b) $[2, +\infty)$
- (c) $(-\infty, -2] \cup [2, \infty)$

[Rusczyk(2012), p.26]

References

[CME Project(2008)] CME Project (2008), *CME Project Precalculus (Teacher's Edition)*. Pearson, URL <http://amazon.com/o/ASIN/0133500241/>.

[MAA(Various)] MAA (Various), *American Mathematics Competition*. MAA.

[Rusczyk(2012)] Rusczyk, Richard (2012), *The Art of Problem Solving Precalculus*. AoPS Inc.