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1. a) dom:  $\{1, 2, 3\}$   
ran:  $\{2, 3, 4, 5\}$   
Not a function
- b) dom:  $\{-2, -1, 0, 1, 2\}$   
ran:  $\{0, 1, 4\}$   
Function
- c) dom:  $[0, +\infty[$   
ran:  $\mathbb{R}$   
Not a function
- d) dom:  $[-2, 2]$   
ran:  $[0, 2]$   
Function
2. a) 1) dom:  $[-3, 5]$  2) ran:  $[-3, 3]$
- b) 1)  $\{-2, 2, 4\}$   
2)  $\{-3\}$
- c) 1)  $[-3, -2] \cup [2, 4]$  2)  $[-2, 2] \cup [4, 5]$
- d) 1)  $[0, 3]$  2)  $[-3, 0] \cup [3, 5]$
- e) 1) 3 2)  $-3$
3. Different answers are possible

4.

	a)	b)	c)	d)
Domain & Range	Dom: $[-3, 3]$ Ran: $[-2, 3]$	Dom: $\mathbb{R}$ Ran: $\mathbb{R}$	Dom: $\mathbb{R}$ Ran: $\mathbb{R}$	Dom: $\mathbb{R}$ Ran: $]-\infty, 4]$
Zeros & y-intercept	Zeros: $\{-2, 0, 2\}$ y-intercept: 0	Zeros: $-2$ y-intercept: $\approx 3.5$	Zeros: $-2$ y-intercept: 1	Zeros: $\{-2, 2\}$ y-intercept: 4
Sign	Positive: $[-3, -2] \cup [0, 2]$ Negative: $[-2, 0] \cup [2, 3]$	Positive: $[-2, +\infty[$ Negative: $]-\infty, -2]$	Positive: $[-2, +\infty[$ Negative: $]-\infty, -2]$	Positive: $[-2, 2]$ Negative: $]-\infty - 2] \cup [2, +\infty[$
Variation	Increasing: $[-1, 1]$ Decreasing: $[-3, -1] \cup [1, 3]$	Increasing: $]-\infty, 1] \cup [4, +\infty[$ Decreasing: $[1, 4]$	Increasing: $\mathbb{R}$ Decreasing: Never	Increasing: $]-\infty, 0]$ Decreasing: $[0, +\infty[$
Extrema	Abs. Max: 3 Abs. Min: $-2$ Rel. Max: 2 Rel. Min: $-1$	Rel. Max: 4 Rel. Min: 1	None	Abs. Max: 4