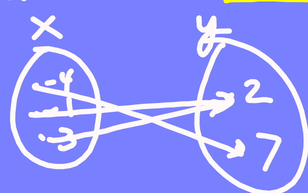
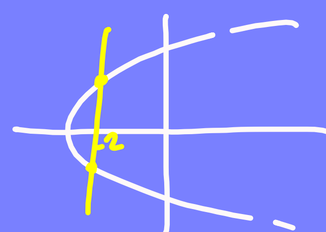
FUNCTIONS

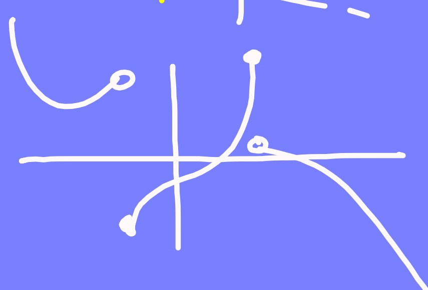
– Each x-coord is paired with exactly one y-coord.

$\{(-2,3)\ (4,-6)\ (5,2)\ (8,-3)\ (4,6)\}$ No





No



yes

$f(x) = 3x^2 - 7x + 9$
$y =$
$f(-2) = 3(-2)^2 - 7(-2) + 9$
$= 12 + 14 + 9$
$= 35$
$(-2, 35)$

Is this a function?

1) $y = 3x^2 + 2$ yes
2) $y = \pm\sqrt{x}$ no
3) $6x + y^2 = 1$ No
$\sqrt{y^2} = \sqrt{1 - 6x}$
$y = \pm\sqrt{1 - 6x}$

$\sqrt{x^2} = \sqrt{4}$

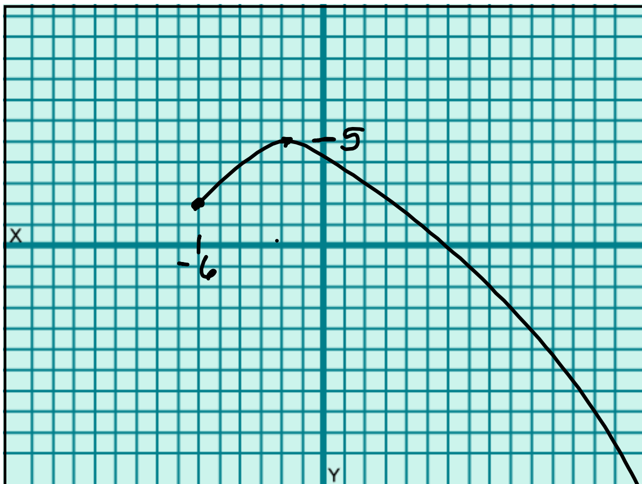
4) $(x)^2 = (\sqrt{y})^2$ yes
$x^2 = y$

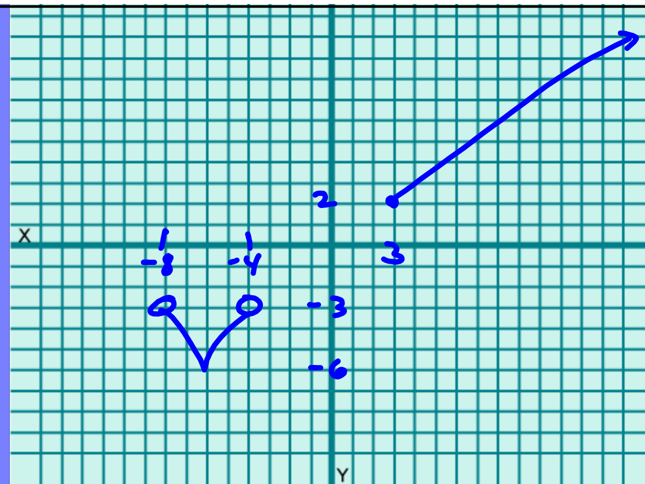
Piecewise

$$f(x) = \begin{cases} x^2 - 4 & x \le 1 \\ 3 & 1 \le x \le 4 \\ \dfrac{2}{x+1} & x > 4 \end{cases}$$

$f(-2) = (-2)^2 - 4 = 0$
$f(17) = \dfrac{2}{17+1} = \dfrac{2}{18} = \dfrac{1}{9}$
$f(2) = 3$

Not a function
1) $\pm$
2) y raised to an even power



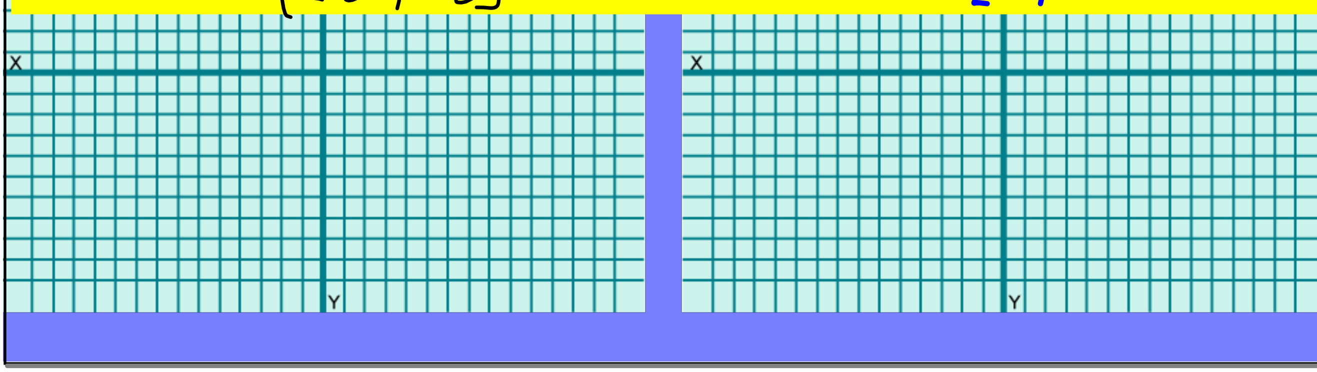


Domain – Set of x-coords – L to R
$[-6, \infty)$

Range – Set of y-coords – Low to High
$(-\infty, 5]$

Domain: $(-8, -4) \cup [3, \infty)$

Range: $[-6, -3) \cup [2, \infty)$



Type of Problem	Domain Restrictions	Method to Solve
Polynomials $y=x^3+2x^2-4x+5$	None	$(-\infty,\infty)$ or $\mathbb{R}$
Rational Func. $f(x)=\frac{x+2}{x-4}$	Denom $\neq 0$	$x\neq 4$ Factor the denom & set $=0$
Odd Root $f(x)=\sqrt[3]{x+2}$	None	$(-\infty,\infty)$ OR $\mathbb{R}$
Even Root $f(x)=\sqrt{x^2-3x-4}$	Must contain + values	Testing Points

$(-\infty,4)\cup(4,\infty)$

$f(x) = \sqrt{x^2 - 3x - 28}$

$(x - 7)(x + 4)$

$-4 \quad 0 \quad 7$

$(-\infty, -4] \cup [7, \infty)$

$f(x) = \sqrt[4]{\dfrac{x^2}{x-5}}$

$-1 \quad 0 \quad 1 \quad 5 \quad 6$

$[0, 0] \cup (5, \infty)$

$f(x) = \dfrac{x^2}{\sqrt[4]{x-5}}$

$x = 0$

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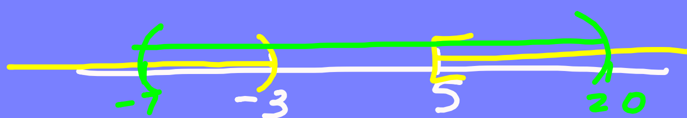
3) $\left[(-\infty,-3)\cup[5,\infty)\right]\cap(-7,20)$



$(-7,-3)\cup[5,20)$