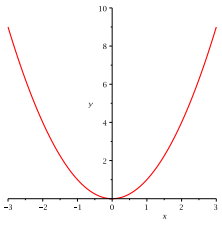
Domain (*and Range*)

EXAMPLES:

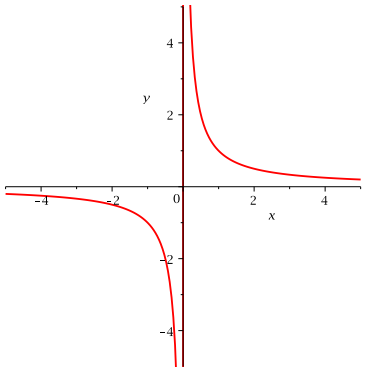


1. $f(x) = x^2$

Domain: All real numbers or $(-\infty, \infty)$. Range: $[0, \infty)$.

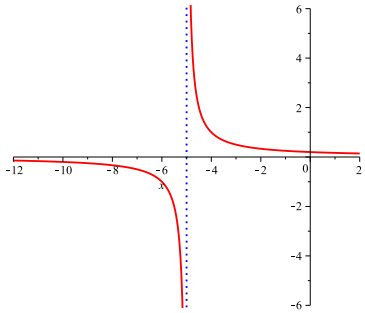
2. $f(x) = \dfrac{1}{x}$

Domain: $(-\infty, 0) \cup (0, \infty)$, since $x \neq 0$. Range: $(-\infty, 0) \cup (0, \infty)$.

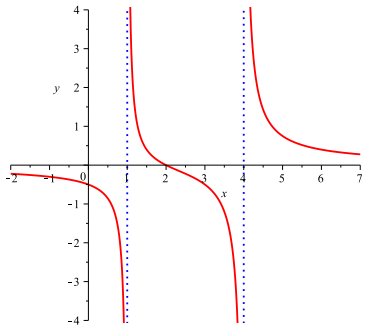


3. $f(x) = \dfrac{1}{x+5}$

Domain: $(-\infty, -5) \cup (-5, \infty)$, since $x + 5 \neq 0$.



4. $f(x) = \dfrac{x-2}{x^2 - 5x + 4}$



Domain: All real numbers except 1 and 4:

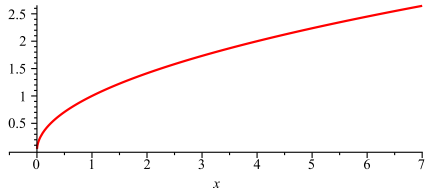
$$(-\infty, 1) \cup (1, 4) \cup (4, \infty)$$

since

$$x^2 - 5x + 4 = (x-1)(x-4) \neq 0$$

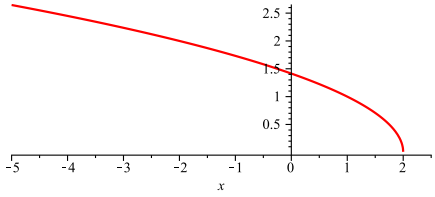
5. $f(x) = \sqrt{x}$

Domain: $[0, \infty)$.
Range: $[0, \infty)$.



6. $f(x) = \sqrt{2 - x}$

Domain: $(-\infty, 2]$, since $2 - x \geq$



7. $f(x) = \sqrt{x^2 + 2}$

Domain: All real numbers, or $(-\infty, \infty)$, since $x^2 + 2$ is always > 0.