

Functions Domain & Range

Remember: The domain of a function is the set of values x can take. The range of a function is the set of values $f(x)$ can take. If you have a quadratic function the vertex is a particularly useful thing to work out. A sketch of your function ($y = f(x)$) is also vital.

A domain is *always* a statement involving x (e.g. $-1 \leq x < 5$) and the range is *always* a statement involving $f(x)$ (e.g. $f(x) \leq 3$).

1. Given $f(x) = (x + 3)^2 + 1$, find the range of $f(x)$.
2. Given $f(x) = x^2 + 8x + 1$, find the range of $f(x)$.
3. Given $f(x) = 2x^2 - 12x - 3$, find the range of $f(x)$.
4. Given $f(x) = -x^2 - 2x + 10$, find the range of $f(x)$.
5. Given $f(x) = 2 + \sqrt{x + 3}$, find the natural domain of $f(x)$. Find the range of $f(x)$.
6. Given $f(x) = x^2 - 4x + 3$, where the domain is restricted to $x \geq 3$, find the range of $f(x)$.
7. Given $f(x) = x^2 + 8x + 1$, where the domain is restricted to $x \leq -1$, find the range of $f(x)$.
8. Given $f(x) = \sin x$, where the domain is restricted to $30 < x < 90$, find the range of $f(x)$.
9. Given $f(x) = -\tan x$, where the domain is restricted to $30 \leq x < 90$, find the range of $f(x)$.
10. Given $f(x) = \frac{2}{x+1}$, where the domain is restricted to $x \geq 0$, find the range of $f(x)$.
11. Given $f(x) = -10^{x-1}$, where the domain is restricted to $x \leq 3$ find the range of $f(x)$.
12. Given $f(x) = x(x - 1)(x + 3)$, where the domain is restricted to $x \geq 2$ find the range of $f(x)$.
13. Given $f(x) = (x - 2)^2(x + 2)^2$, where the domain is restricted to $-2 \leq x \leq 2$ find the range of $f(x)$.