Test Functions for Single-Objective Optimization Problems

	FORMULA	SEARCH DOMAIN
1	$f(x,y) = -20\exp\left(-0.2\sqrt{0.5\left(x^2+y^2\right)}\right) - \exp\left(0.5\left(\cos\left(2\pi x\right)+\cos\left(2\pi y\right)\right)\right) + e + 20$	$-5 \leq x, y \leq 5$
2	$f(\boldsymbol{x}) = \sum_{i=1}^{n} x_i^2$	$-\infty \leq x_i \leq \infty$, $1 \leq i \leq n$
3	$f(\boldsymbol{x}) = \sum_{i=1}^{n-1}\left[100\left(x_{i+1}-x_i^2\right)^2 + \left(x_i-1\right)^2\right]$	$-\infty \leq x_i \leq \infty$, $1 \leq i \leq n$
4	$f(x,y) = \left(1.5 - x + xy\right)^2 + \left(2.25 - x + xy^2\right)^2 + \left(2.625 - x + xy^3\right)^2$	$-4.5 \leq x, y \leq 4.5$
5	$f(x,y) = \left(1 + (x+y+1)^2\left(19 - 14x + 3x^2 - 14y + 6xy + 3y^2\right)\right)$ $\left(30 + (2x-3y)^2\left(18 - 32x + 12x^2 + 48y - 36xy + 27y^2\right)\right)$	$-2 \leq x, y \leq 2$
6	$f(x,y) = \left(x + 2y - 7\right)^2 + \left(2x + y - 5\right)^2$	$-10 \leq x, y \leq 10$
7	$f(x,y) = 100\sqrt{\left\lvert y - 0.01x^2\right\rvert} + 0.01\left\lvert x + 10\right\rvert.$	$-15 \leq x \leq -5$, $-3 \leq y \leq 3$
8	$f(x,y) = 0.26\left(x^2+y^2\right) - 0.48xy$	$-10 \leq x, y \leq 10$
9	$f(x,y) = \sin^2\left(3\pi x\right) + \left(x-1\right)^2\left(1+\sin^2\left(3\pi y\right)\right) + \left(y-1\right)^2\left(1+\sin^2\left(2\pi y\right)\right)$	$-10 \leq x, y \leq 10$
0	$f(x,y) = 2x^2 - 1.05x^4 + \frac{x^6}{6} + xy + y^2$	$-5 \leq x, y \leq 5$