|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Function f(x) | y- direction | | x-direction | |
| Shift Up/Down | Stretch scale factor | Shift left/Right | Stretch scale factor |
| f() = ² to f() = ² + 5 | Up 5 units | X | X | X |
| f() = ² to f() = ² - 7 |  |  |  |  |
| f() = ² to f() = 4² |  |  |  |  |
| f() = ² to f() = 0.5² |  |  |  |  |
| f() = ² to f() = ( - 8)² |  |  |  |  |
| f() = ² to f() = ( + 8)² |  |  |  |  |
| f() = ² to f() = ()² |  |  |  |  |
| f() = ² to f() =² |  |  |  |  |
| f() = to f() = |  |  |  |  |
| f() = to f() = |  |  |  |  |
| f() = to f() = |  |  |  |  |
| f() = to f() = |  |  |  |  |
| f() = to f() = |  |  |  |  |
| f() = to f() = |  |  |  |  |
| f() = to f() = |  |  |  |  |
| f() = to f() = |  |  |  |  |

Describe the transformation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Function f(x) | y- direction | | x-direction | |
| Shift Up/Down | Stretch scale factor | Shift left/Right | Stretch scale factor |
| f() = ² to f() = ² + 4 |  |  |  |  |
| f() = ² to f() = ² + 4 |  |  |  |  |
| f() = ² to f() = 2(² + 4 |  |  |  |  |
| f() = ² + 2 to f() =² + 2 + 120 |  |  |  |  |
| f() = ² + 2 to f() =² + 2 - 36 |  |  |  |  |
| f() = ² + 2 to f() =² + 2 |  |  |  |  |
| f() = ² + 2 to f() =² + 32 |  |  |  |  |
| f() = ² + 2 to f() =² + 2( |  |  |  |  |
| f() = ² + 2 to f() = + 7)² + 2( |  |  |  |  |
| f() = ² + 2 to f() =² + 2( |  |  |  |  |
| f() = ² + 3 to f() =² + 3 + 25 |  |  |  |  |
| f() = ² + 3 to f() =² + 3 - 25 |  |  |  |  |
| f() = ² + 3 to f() =² + 3 + 6) |  |  |  |  |
| f() = ² + 3 to f() =² +15 + 30 |  |  |  |  |
| f() = ² + 8 to f() =² + 4 + 10 |  |  |  |  |
| f() = ² + 3 to f() =² + 3( +2 |  |  |  |  |

Now check your work on [www.desmos.com](http://www.desmos.com) or email [jforsythe@passion4maths.com](mailto:jforsythe@passion4maths.com) for the answers.