|  |  |  |
| --- | --- | --- |
| Function f(x) | y- direction | x-direction |
| Shift Up/Down | Stretch scale factor | Shift left/Right | Stretch scale factor |
| f($ x$) = $ x$² to f($ x$) = $ x$² + 5 | $√$ Up 5 units | X | X | X |
| f($ x$) = $ x$² to f($ x$) = $ x$² - 7 |  |  |  |  |
| f($ x$) = $ x$² to f($ x$) = 4$ x$² |  |  |  |  |
| f($ x$) = $ x$² to f($ x$) = 0.5$ x$² |  |  |  |  |
| f($ x$) = $ x$² to f($ x$) = ($ x$ - 8)²$ $ |  |  |  |  |
| f($ x$) = $ x$² to f($ x$) = ($ x$ + 8)² |  |  |  |  |
| f($ x$) = $ x$² to f($ x$) = ()² |  |  |  |  |
| f($ x$) = $ x$² to f($ x$) =$ (2x)$² |  |  |  |  |
| f($ x$) = $ x³$ to f($ x$) =$ x³+2.5$ |  |  |  |  |
| f($ x$) = $ x³$ to f($ x$) =$ x³- 9.25$ |  |  |  |  |
| f($ x$) = $ x³$ to f($ x$) =$ 3x³$ |  |  |  |  |
| f($ x$) = $ x³$ to f($ x$) =$ \frac{1}{4}x³$ |  |  |  |  |
| f($ x$) = $ x³$ to f($ x$) =$ (x-6)³$ |  |  |  |  |
| f($ x$) = $ x³$ to f($ x$) =$(x+17)³$ |  |  |  |  |
| f($ x$) = $ x³$ to f($ x$) =$(\frac{x^{3}}{4} )$ |  |  |  |  |
| f($ x$) = $ x³$ to f($ x$) =$( 5x)³$ |  |  |  |  |

Describe the transformation

|  |  |  |
| --- | --- | --- |
| Function f(x) | y- direction | x-direction |
| Shift Up/Down | Stretch scale factor | Shift left/Right | Stretch scale factor |
| f($ x$) = $ x$² to f($ x$) = $ x$² + 4 |  |  |  |  |
| f($ x$) = $ x$² to f($ x$) = $(x-3)$² + 4 |  |  |  |  |
| f($ x$) = $ x$² to f($ x$) = 2($ x-3)$² + 4 |  |  |  |  |
| f($ x$) = $ x$² + 2$ x$ to f($ x$) =$ x$² + 2$ x$ + 120 |  |  |  |  |
| f($ x$) = $ x$² + 2$ x$ to f($ x$) =$ x$² + 2$ x$ - 36 |  |  |  |  |
| f($ x$) = $ x$² + 2$ x$ to f($ x$) =$ 4(x$² + 2$ x)$ |  |  |  |  |
| f($ x$) = $ x$² + 2$ x$ to f($ x$) =$ 16x$² + 32$ x$ |  |  |  |  |
| f($ x$) = $ x$² + 2$ x$ to f($ x$) =$( x-2)$² + 2($ x-2)$ |  |  |  |  |
| f($ x$) = $ x$² + 2$ x$ to f($ x$) =$ (x$ + 7)² + 2($ x+7)$ |  |  |  |  |
| f($ x$) = $ x$² + 2$ x$ to f($ x$) =$ (\frac{x}{2})$² + 2($\frac{x}{2})$ |  |  |  |  |
| f($ x$) = $2x$² + 3$ x+2$ to f($ x$) =$ 2x$² + 3$ x$ + 25 |  |  |  |  |
| f($ x$) = $2x$² + 3$ x+2$ to f($ x$) =$ 2x$² + 3$ x$ - 25 |  |  |  |  |
| f($ x$) = $2x$² + 3$ x+6$ to f($ x$) =$ 2(2x$² + 3$ x$ + 6) |  |  |  |  |
| f($ x$) = $2x$² + 3$ x+6$ to f($ x$) =$ 10x$² +15 $ x$ + 30 |  |  |  |  |
| f($ x$) = $2x$² + 8$ x+20$ to f($ x$) =$ x$² + 4$ x$ + 10 |  |  |  |  |
| f($ x$) = $2x$² + 3$ x+2$ to f($ x$) =$ 2(x-10)$² + 3($ x-10)$ +2 |  |  |  |  |

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