

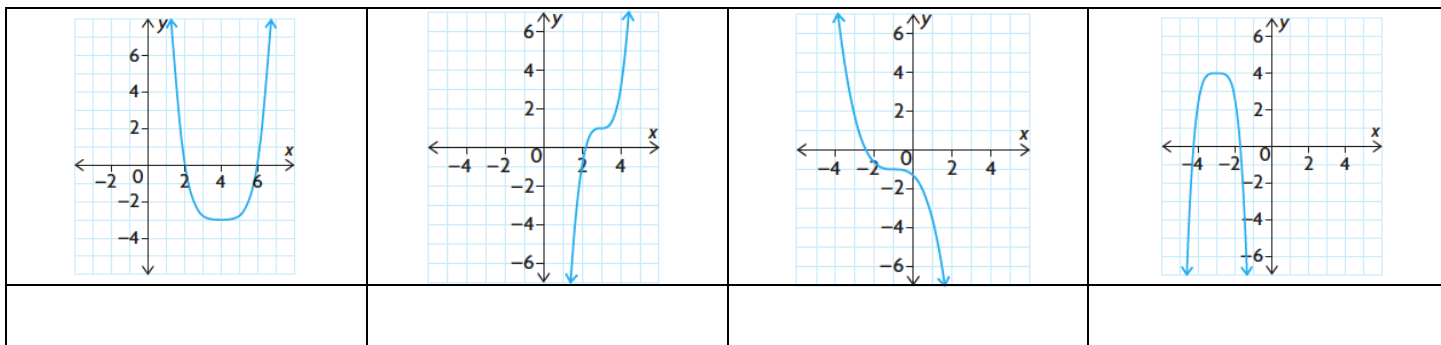
W4 – 1.4 – Transformations

MHF4U

Jensen

1) Match each graph with the corresponding function.

A) $y = 2(x - 3)^3 + 1$ **B)** $y = -\frac{1}{3}(x + 1)^3 - 1$ **C)** $y = 0.2(x - 4)^4 - 3$ **D)** $y = -1.5(x + 3)^4 + 4$



2) List a good set of key points for the following parent functions:

$f(x) = x^2$	
x	y

$f(x) = x^3$	
x	y

$f(x) = x^4$	
x	y

$f(x) = x^5$	
x	y

3) Identify the a , k , d and c values and explain what transformation is occurring to the parent function:

a) $f(x) = -2(x - 1)^2$

b) $g(x) = [-\frac{1}{3}(x + 5)]^4 - 1$

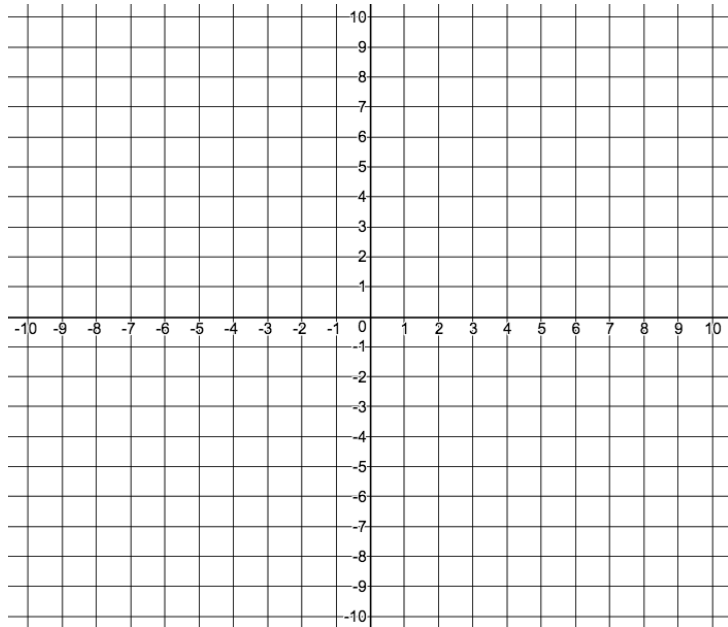
4) Write the full equation given the parent function and the transforming function:

a) $f(x) = x^5$, $g(x) = -3f[2(x + 5)] - 1$

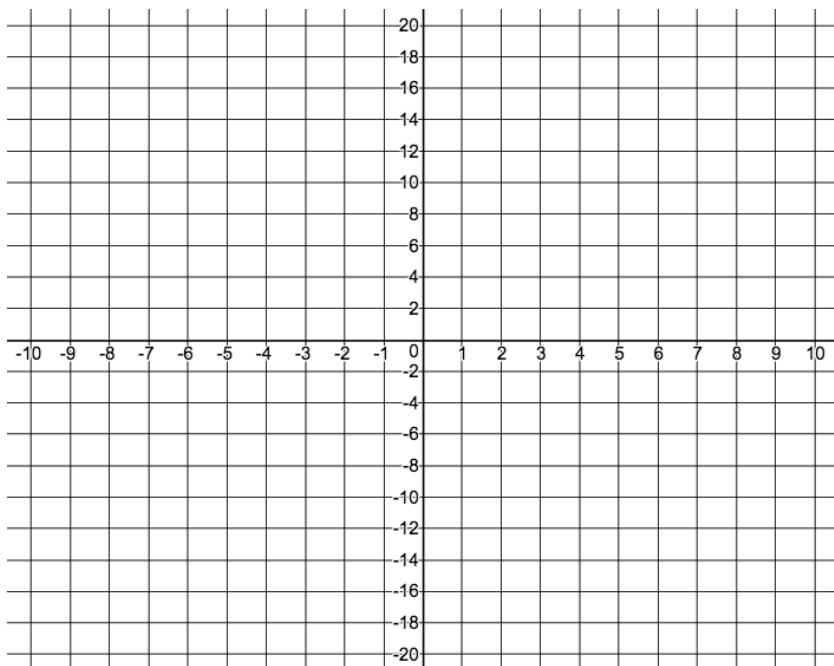
b) $f(x) = x^3$, $g(x) = \frac{1}{2}f[-\frac{1}{4}(x - 4)] + 7$

5) For the following questions, use the key points of the parent function to perform transformations. Graph the parent and transformed function. Write the equation of the transformed function.

a) $f(x) = x^4$ $g(x) = \frac{1}{2}f[-(x - 5)] + 1$



b) $f(x) = x^3$ $g(x) = -f[-2(x + 1)] + 6$



6) Write an equation for the function that results from the given transformations.

a) The function $f(x) = x^4$ is translated 2 units to the left and 3 units up.

b) The function $f(x) = x^5$ is stretched horizontally by a factor of 5 and translated 12 units to the left.

c) The function $f(x) = x^4$ is stretched vertically by a factor of 3, reflected vertically in the x -axis, and translated 6 units down and 1 unit to the left.

d) The function $f(x) = x^6$ is reflected vertically in the x -axis, stretched horizontally by a factor of 5, reflected horizontally in the y -axis, and translated 3 units down and 1 unit to the right.

ANSWER KEY

1) C A B D

2)

$f(x) = x^2$	
x	y
-2	4
-1	1
0	0
1	1
2	4

$f(x) = x^3$	
x	y
-2	-8
-1	-1
0	0
1	1
2	8

$f(x) = x^4$	
x	y
-2	16
-1	1
0	0
1	1
2	16

$f(x) = x^5$	
x	y
-2	-32
-1	-1
0	0
1	1
2	32

3) a) $a = -2$; vertical reflection and vertical stretch by a factor of 2 ($-2y$)
 $d = 1$; shift right 1 unit ($x + 1$)

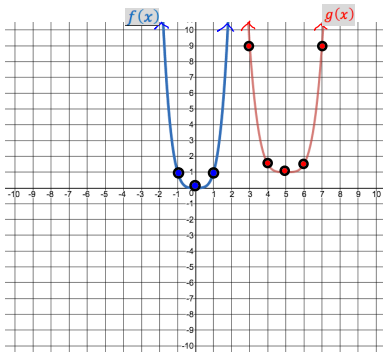
b) $k = -\frac{1}{3}$; horizontal reflection and horizontal stretch by a factor of 3 ($-3x$)
 $d = -5$; shift left 5 units ($x - 5$)
 $c = -1$; shift down 1 unit ($y - 1$)

4) a) $g(x) = -3[2(x + 5)]^5 - 1$ b) $g(x) = \frac{1}{2}[-\frac{1}{4}(x - 4)]^3 + 7$

5) a)

$f(x) = x^4$	
x	y
-2	16
-1	1
0	0
1	1
2	16

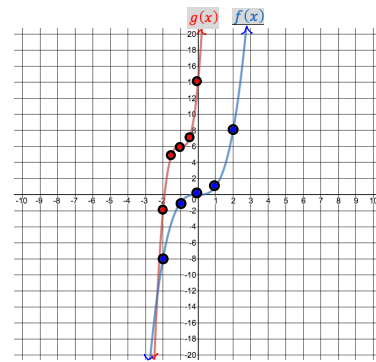
$g(x) = \frac{1}{2}[-(x - 5)]^4 + 1$	
$-x + 5$	$\frac{y}{2} + 1$
7	9
6	1.5
5	1
4	1.5
3	9



b)

$f(x) = x^3$	
x	y
-2	-8
-1	-1
0	0
1	1
2	8

$g(x) = -[-2(x + 1)]^3 + 6$	
$\frac{x}{-2} - 1$	$-y + 6$
0	14
-0.5	7
-1	6
-1.5	5
-2	-2



6) a) $g(x) = (x + 2)^4 + 3$ b) $g(x) = \left[\frac{1}{5}(x + 12)\right]^5$ c) $g(x) = -3(x + 1)^4 - 6$ d) $g(x) = -\left[-\frac{1}{5}(x - 1)\right]^6 - 3$