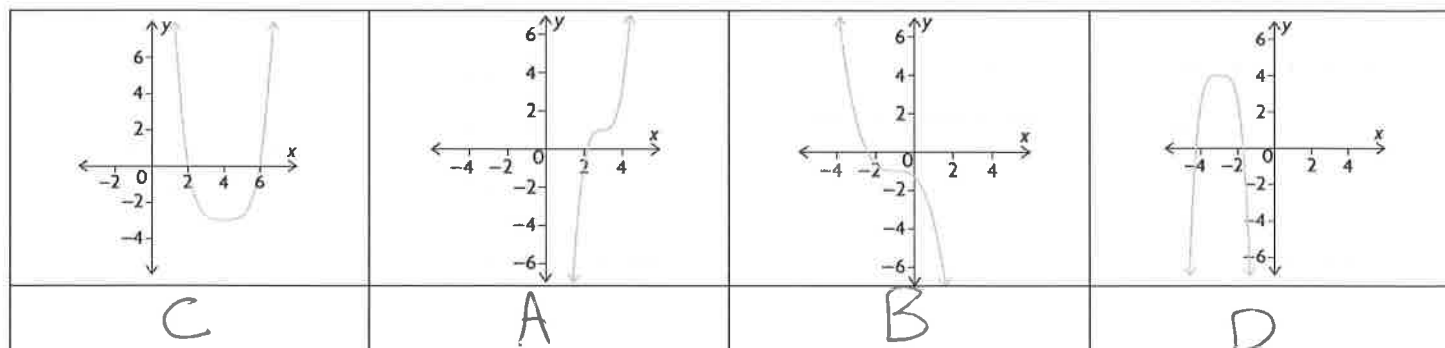


1) Match each graph with the corresponding function.

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

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

$a = -2$; vertical reflection
vertical stretch factor 2 ($-2y$)

$d = 1$; shift 1 unit RIGHT ($x+1$)

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

$k = -\frac{1}{3}$; horizontal reflection
horizontal stretch factor 3 ($-3x$)

$d = -5$; shift 5 units LEFT ($x-5$)

$c = -1$; shift down 1 unit ($y-1$)

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

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

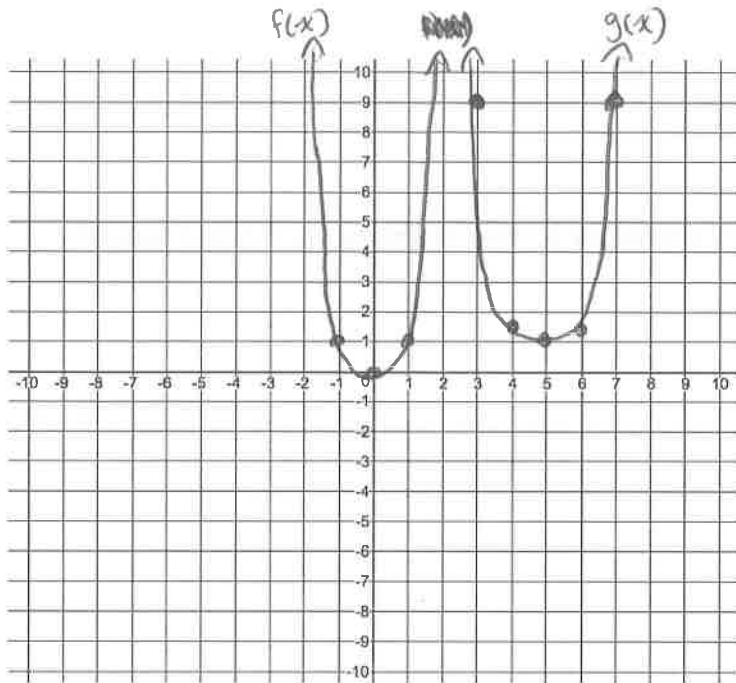
$$g(x) = -3[2(x+5)]^5 - 1$$

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

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

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



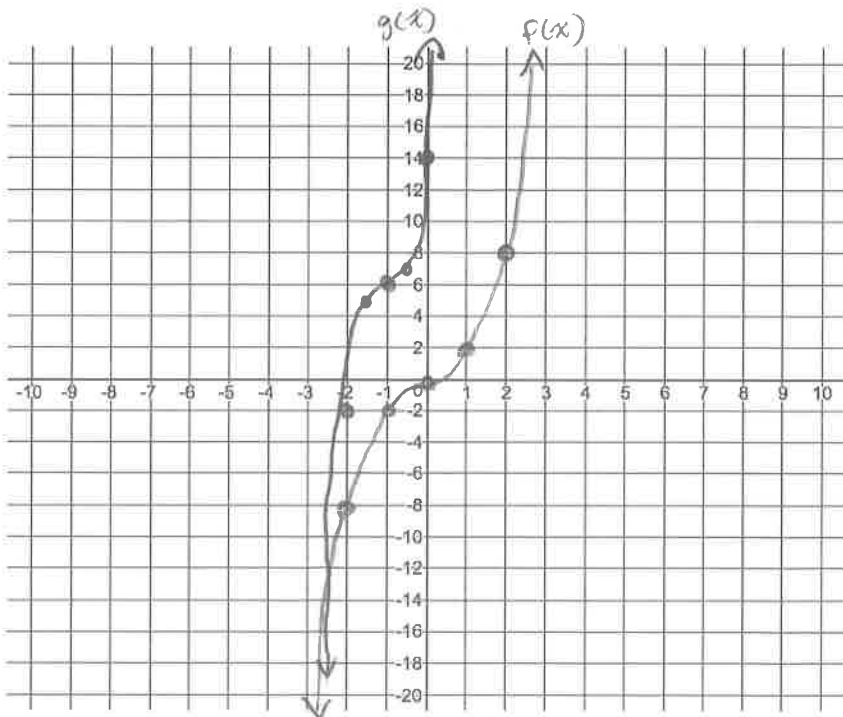
$f(x) = x^4$

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	10.5
5	1
4	10.5
3	9

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



$f(x) = x^3$

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) 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. $d = -2$ $c = 3$

$$g(x) = (x+2)^4 + 3$$

b) The function $f(x) = x^5$ is stretched horizontally by a factor of 5 and translated 12 units to the left. $k = 1/5$ $d = -12$

$$g(x) = \left[\frac{1}{5}(x+12)\right]^5$$

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. $a = -3$ $c = -6$ $d = -1$

$$g(x) = -3(x+1)^4 - 6$$

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. $a = -1$ $k = 1/5$ $c = -3$ $d = 1$

$$g(x) = -\left[-\frac{1}{5}(x-1)\right]^6 - 3$$

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 ($x - 5$)

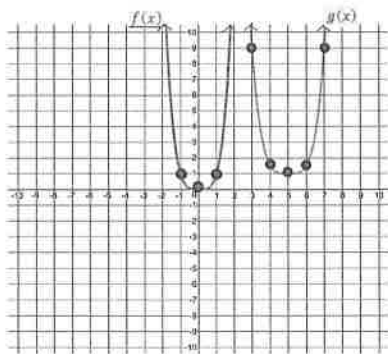
$c = -1$; shift down 1 unit ($y - 1$)

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

5) a)

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

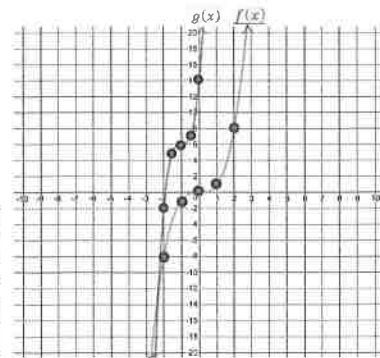
$g(x) = \frac{1}{2}[-(x-5)]^4 + 1$	
$-x+5$	$\frac{1}{2}y+1$
7	9
6	1.5
5	1
4	1.5
3	9



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) $g(x) = -\left[-\frac{1}{5}(x-1)\right]^6 - 3$