

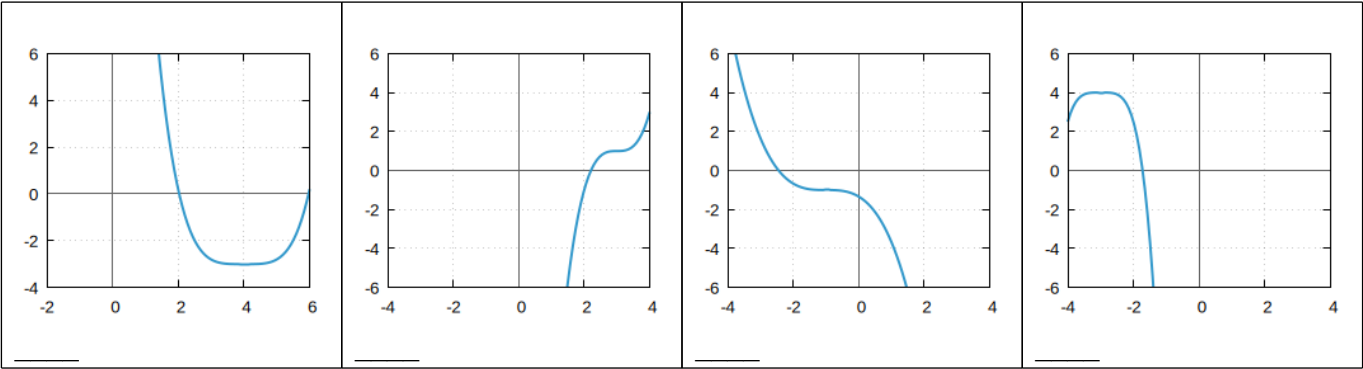
1.4 Transformations Worksheet

This document was composed and formatted by Annie Bernatchez.

The course material originated from www.jensenmath.ca

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:

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

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

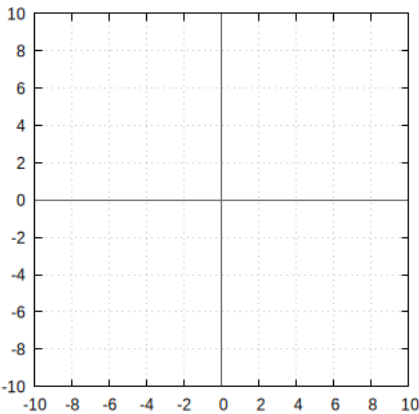
5) For the following questions, use the key points of the parent function to perform transformations. Graph the parent and transformed function. Write the equation of the transformed function.

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

f(x) = x⁴

x	y

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

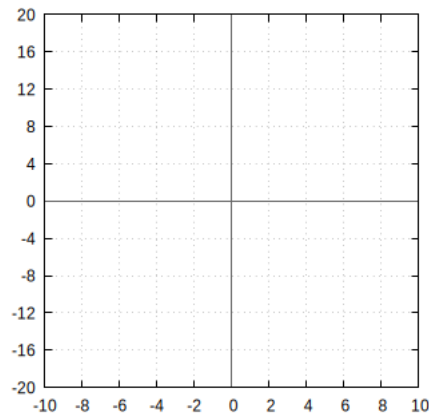


b) $f(x) = x^3 \quad g(x) = -f[-2(x + 1)] + 6$

f(x) = x³

x	y

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 (in order of the graphs shown)

2) Key points (x from -2 to 2): $f(x) = x^2$: 4, 1, 0, 1, 4. $f(x) = x^3$: -8, -1, 0, 1, 8. $f(x) = x^4$: 16, 1, 0, 1, 16. $f(x) = x^5$: -32, -1, 0, 1, 32.

3) a) $a = -2$ (vertical reflection, stretch factor 2); $d = 1$ (shift right 1)

b) $k = -\frac{1}{3}$ (horizontal reflection, stretch factor 3); $d = -5$ (shift left 5); $c = -1$ (shift down 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) $g(x) = \frac{1}{2}(x-5)^4 + 1$ b) $g(x) = 8(x+1)^3 + 6$

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