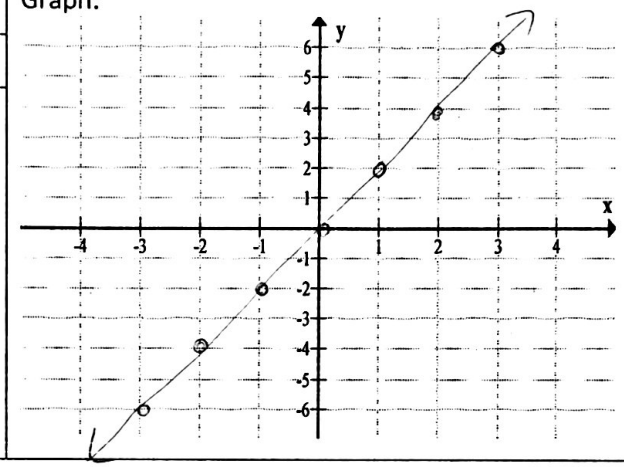
Test Tune-up: Quadratic Relations | MPM2D

Create a table of values for the following 3 relations (decimals are OK for the third). Calculate the first and second differences for each relation. Then, graph them on the provided grid.

Relation: $y = 2x$

x	y	1st Diff.	2nd Diff.
-3	-6	2	
-2	-4	2	
-1	-2	2	
0	0	2	
1	2	2	
2	4	2	
3	6		

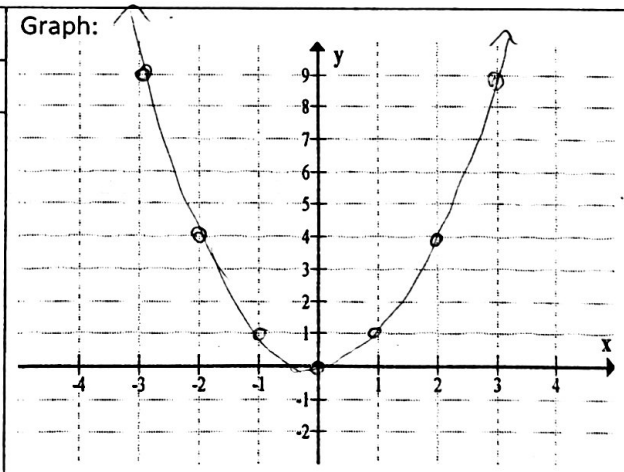
Graph:



Relation: $y = x^2$

x	y	1st Diff.	2nd Diff.
-3	9	-5	2
-2	4	-3	2
-1	1	-1	2
0	0	1	2
1	1	3	2
2	4	5	
3	9		

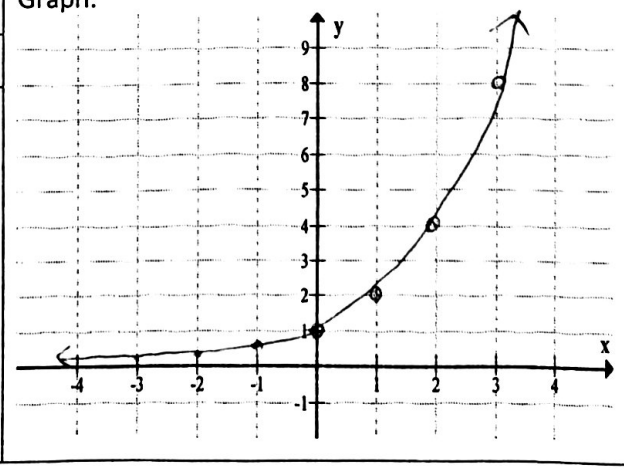
Graph:



Relation: $y = 2^x$

x	y	1st Diff.	2nd Diff.
-3	0.125	0.125	0.125
-2	0.25	0.25	0.25
-1	0.5	0.5	0.5
0	1	1	1
1	2	2	2
2	4	4	
3	8		

Graph:



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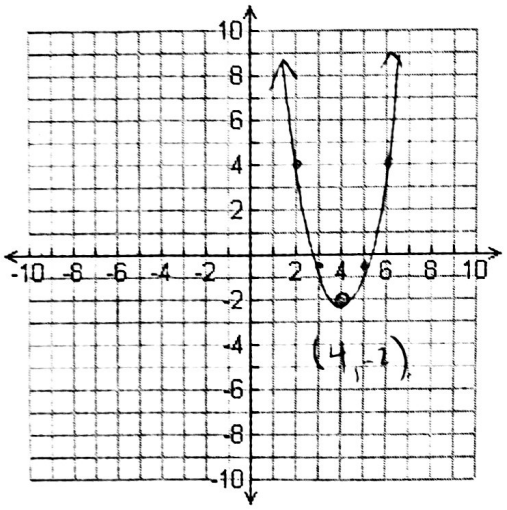
2) Describe the 4 transformations from the basic parabola $y = x^2$ that the following quadratic relations undergoes: $y = -3(x+2)^2 + 5$

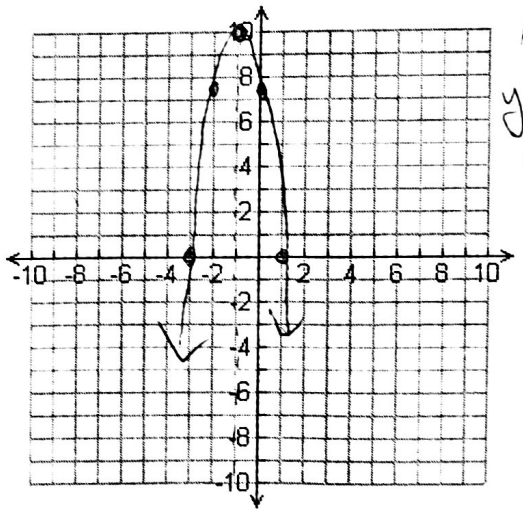
1) Shifted / translated ↑ 5 and ← 2
2) Reflected in x-axis $(a < 0)$
3) Stretched vertically by a factor of 3

3) Graph the following two quadratic relations:

a) $y = 1.5(x-4)^2 - 2$ 1.5, 4.5, 7.5



b) $y = -2.5(x-1)(x+3)$ -2.5, -7.5, -12.5



AOS: $x = -1$

$y = -2.5(-1-1)(-1+3)$

$= -2.5(-2)(2)$

$= 10$

4) Find equation (in vertex form) of a parabola with a vertex of (5, 4), with a y-intercept of 16.5. ↳ (0, 16.5)

$y = a(x-h)^2 + k$

$y = a(x-5)^2 + 4$ (VERTEX)

$16.5 = a(0-5)^2 + 4$ (POINT)

$16.5 = 25a + 4$

$12.5 = 25a$

$a = 0.5$

$y = 0.5(x-5)^2 + 4$

5) Find the equation (in factored form) of a parabola with x-intercepts of 5 and -1, with a maximum value of 10. → AOS: $x = 2$, vertex: (2, 10)

$y = a(x-5)(x-t)$

$y = a(x-5)(x+1)$

$10 = a(2-5)(2+1)$

$10 = a(-3)(3)$

$10 = -9a$

$a = -10/9$

$y = -10/9(x-5)(x+1)$