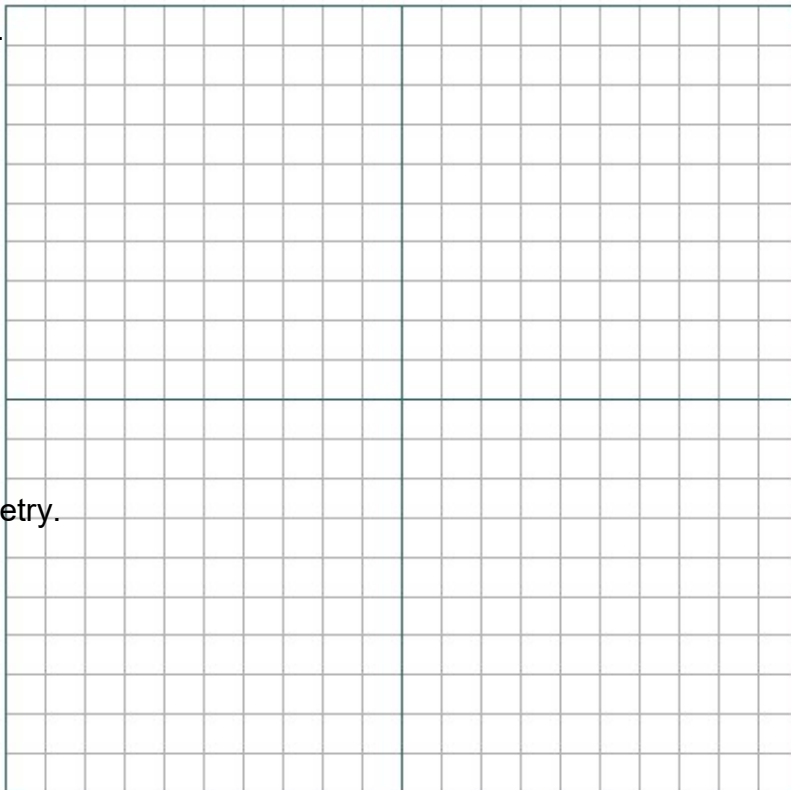# *Math 11 ·* **Quadratic Functions**

Sketch (clearly show five points).
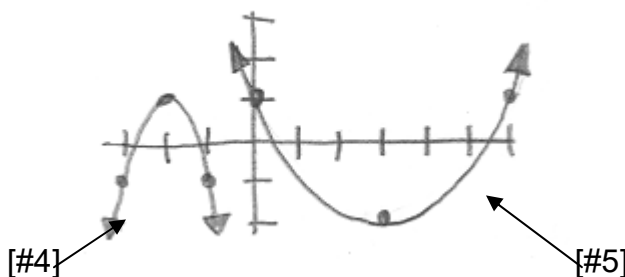
[#1]   $y = 3(x - 2)^2 - 5$

[#2]   $y = -\dfrac{1}{2}(x + 3)^2$

Sketch and then determinine....
the equation of the axis of symmetry.
the maximum/minimum value
the domain
the range
the x–intercept(s)
the y–intercept

[#3]   $y = -2(x - 1)^2 + 2$

Write the equations of the parabolas shown or described.



[#4]                                   [#5]

[#6]   the vertex is (5, –2) and it passes through (1, –6)

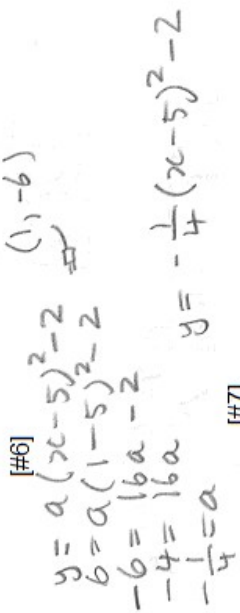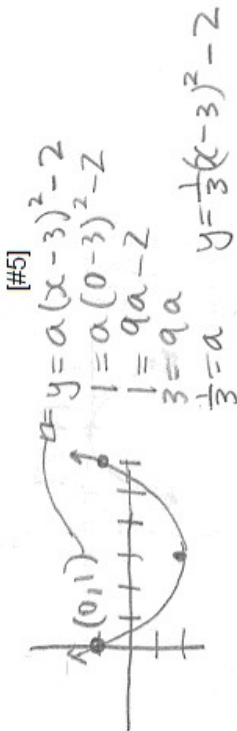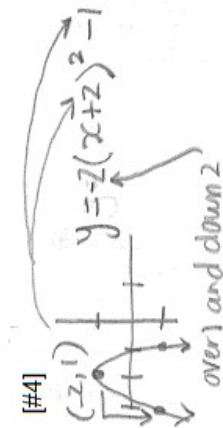[#7]   the maximum point is (3, 1) and it is congruent to $y = 3x^2$

# Key

## [#4]

$(-2, 1)$

$y = -2(x+2)^2 - 1$

over 1 and down 2

## [#5]

$y = a(x-3)^2 - 2$

$1 = a(0-3)^2 - 2$

$1 = 9a - 2$

$3 = 9a$

$\frac{1}{3} = a$

$y = \frac{1}{3}(x-3)^2 - 2$

$(0,1)$

## [#6]

$y = a(x-5)^2 - 2$

$6 = a(1-5)^2 - 2$

$-6 = 16a - 2$

$-4 = 16a$

$-\frac{1}{4} = a$

$y = -\frac{1}{4}(x-5)^2 - 2$

$(1, -6)$

## [#7]
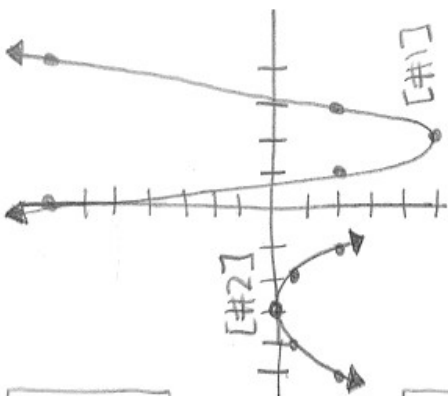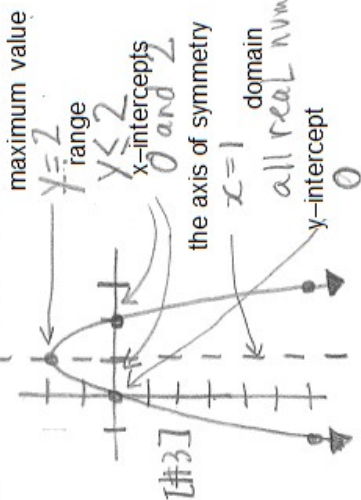
vertex $(3, 1)$

$y = -3(x-3)^2 + 1$

congruent (same shape, same $a$)

(because the vertex is a maximum, $a$ must be a negative)

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$y = 3(x-2)^2 - 5$

$V(2, -5)$

$a = 3$

| x | y |
|---|---|
| 1 | 3 |
| 2 | 12 |

$y = -\frac{1}{2}(x+3)^2$

$V(-3, 0)$

$a = -\frac{1}{2}$

| x | y |
|---|---|
| 1 | $\frac{1}{2}$ |
| 2 | $\frac{1}{2}$ |

$y = -2(x-1)^2 + 2$

$V(1, 2)$

$a = -2$

| x | y |
|---|---|
| 1 | -2 |
| 2 | -8 |

[#1]

[#2]

## [#3]

maximum value $y = 2$

range $y \leq 2$

x-intercepts 0 and 2

the axis of symmetry $x = 1$

domain all real numbers

y-intercept 0