

# Mathematics 10D

## Properties of Quadratics

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## 1. Properties of Parabolas/Quadratics

- Quadratics are the equations.
- Parabolas are the graphs.

There are three equations of quadratics.

### 1. Standard Form

$$y = \underline{a}x^2 + bx + c$$

$\hookrightarrow$  the  $y$ -intercept

if  $a > 0$ , the parabola opens up.

if  $a < 0$ , it opens down.

### 2. Zeros/Factored Form

$$y = \underline{a}(x - r)(x - s)$$

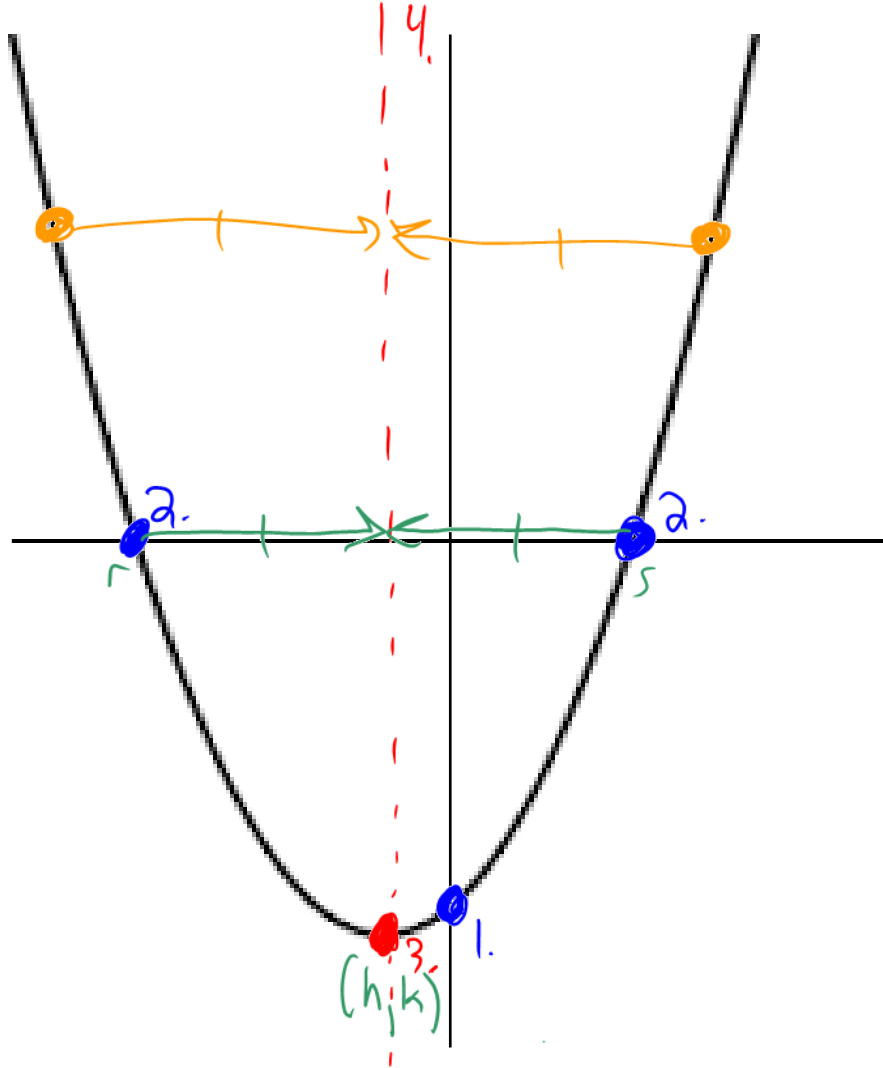
$\hookrightarrow$  the zeros or the  $x$ -intercepts.

### 3. Vertex Form

$$y = \underline{a}(x - h)^2 + k$$

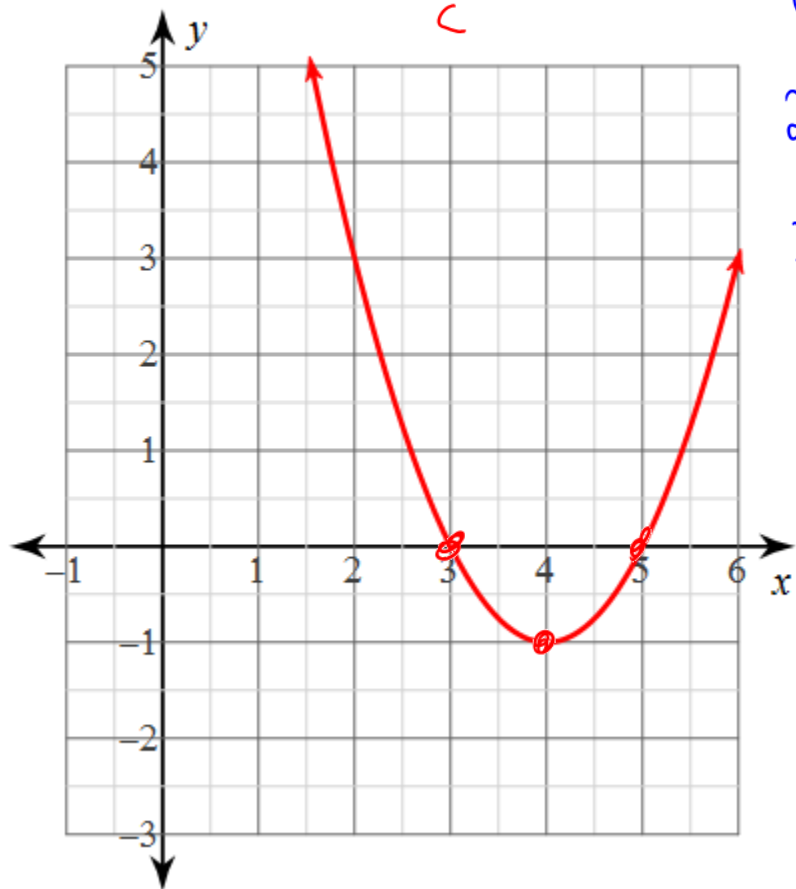
$\hookrightarrow (h, k)$  is the vertex

# Properties of Parabolas



1. The y-intercept, the  $c$
2. The x-intercepts,  $\underline{r}$  and  $\underline{s}$
3. Vertex, is the maximum or the minimum of the parabola  $(h, k)$
4. Axis of symmetry,  $x = h$   
$$h = \frac{r+s}{2}$$

1)  $y = x^2 - 8x + 15$   
c



State:

1. Direction of opening: up

2. Y-intercept:  $y = 15$  c

3. Zeros:  $x = 3$  and  $x = 5$

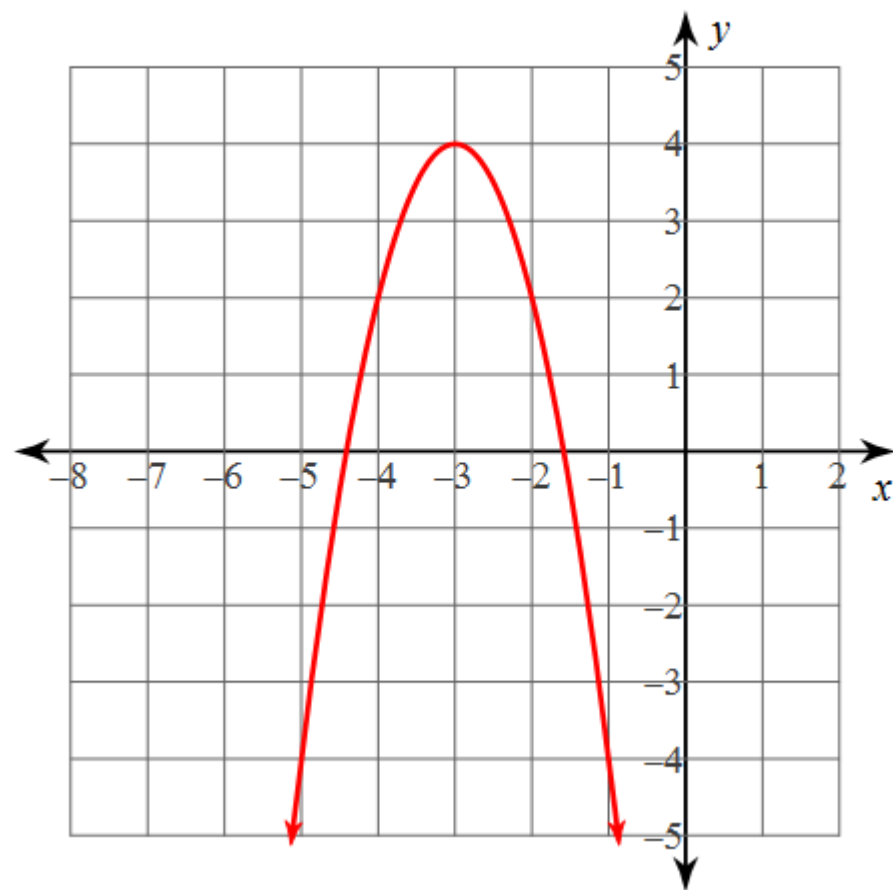
4. Vertex: (4, -1)

5. AoS:  $x = 4$

6. Max/Min Value: Min of -1.

2)  $y = -2x^2 - 12x - 14$

State:



1. Direction: down

2. y-int:  $y = -14$

3. Zeros:  $x = -1.5$  and  $x = -4.5$

4. Vertex:  $(-3, 4)$

5. Axis:  $x = -3$

6. Max/min: Max of 4.