그래프를 활용한 이차부등식 풀기
(Solving Quadratic Inequalities by Graphing)

Solving Quadratic Inequalities by Graphing

Start End

$$y = ax^2 + bx + c \ (a > 0, \ b, c \in R)$$

$$y = ax^2 + bx + c \ (a > 0, \ b, c \in R)$$

$$D = b^2 - 4ac$$

$$y = ax^2 + bx + c \ (a > 0, \ b, c \in R)$$

$$D = b^2 - 4ac > 0$$

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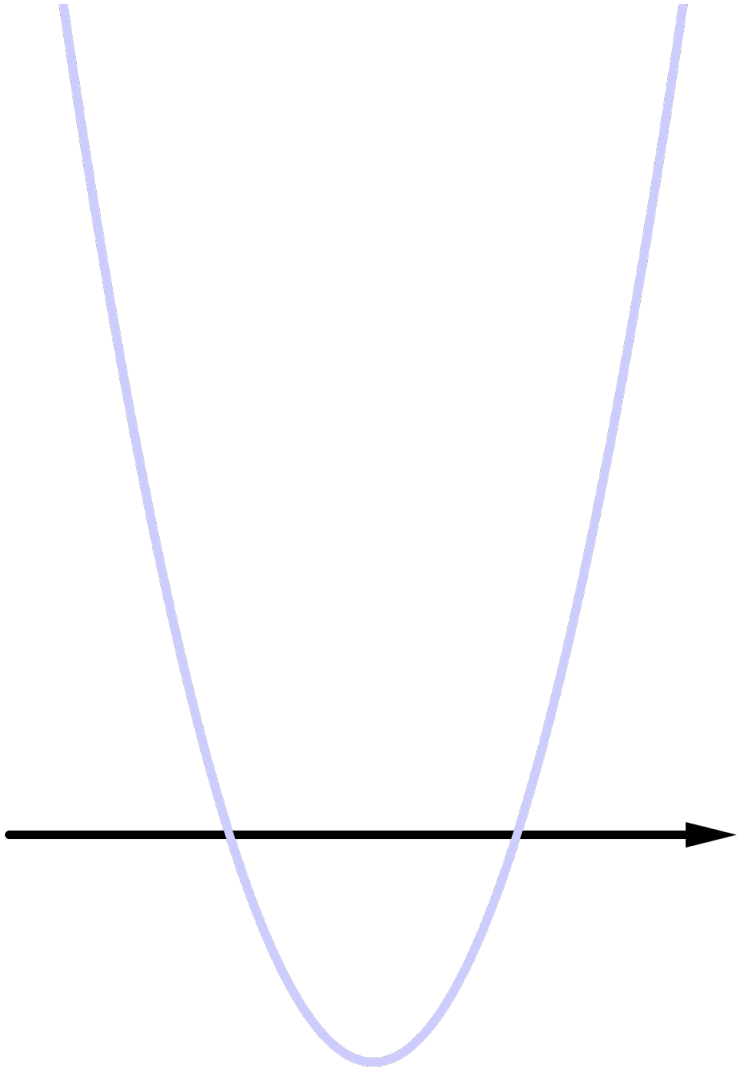
Start End



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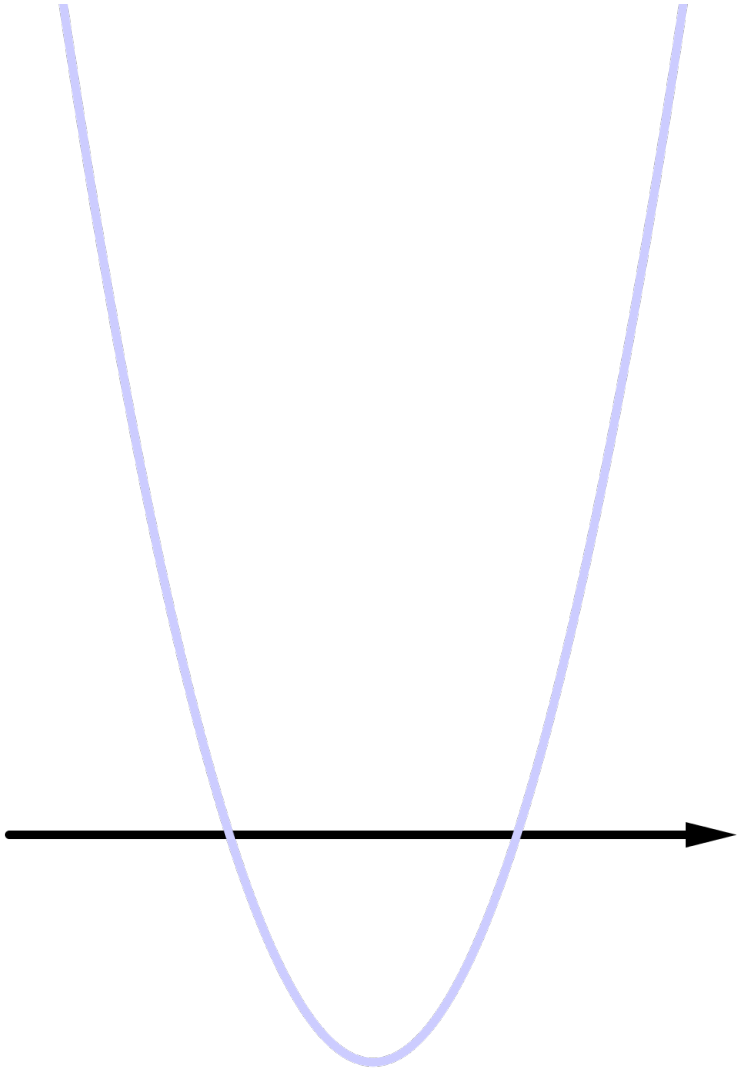
Start End



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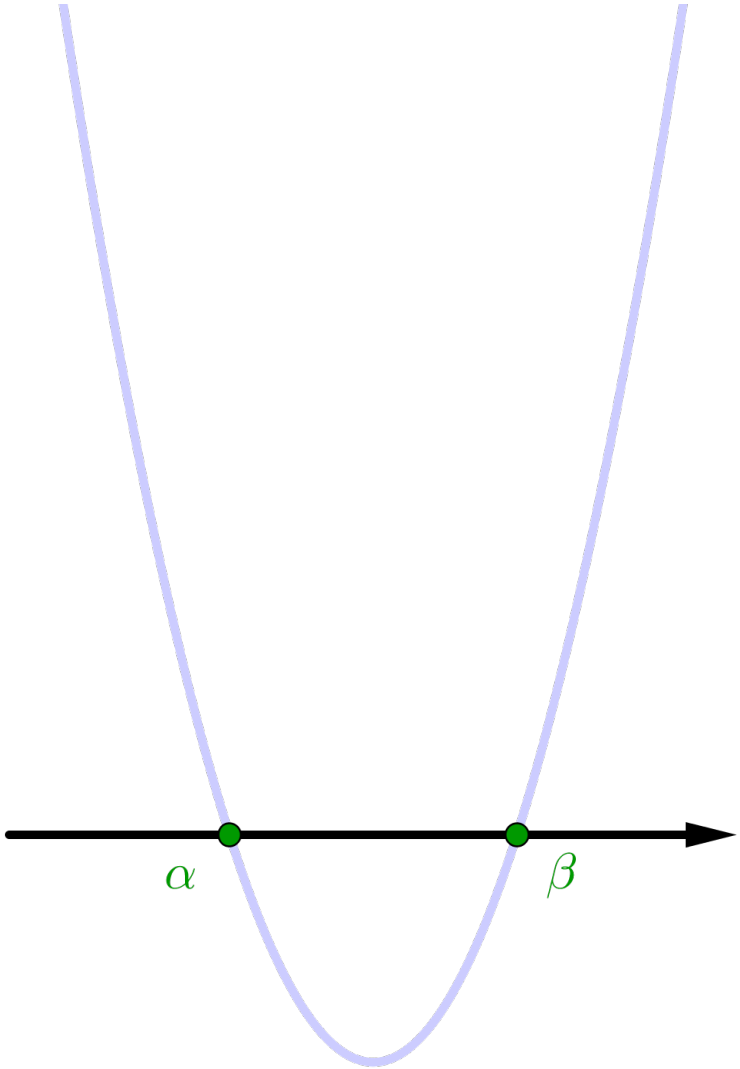
$$ax^2 + bx + c = 0$$

Start End



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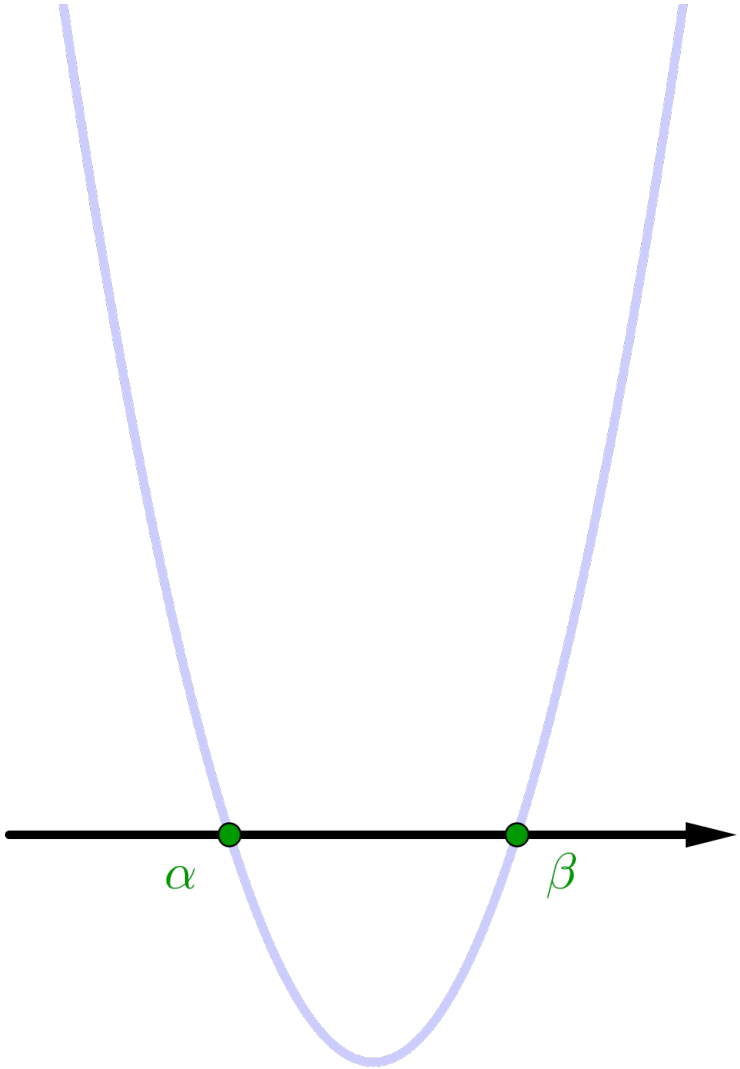

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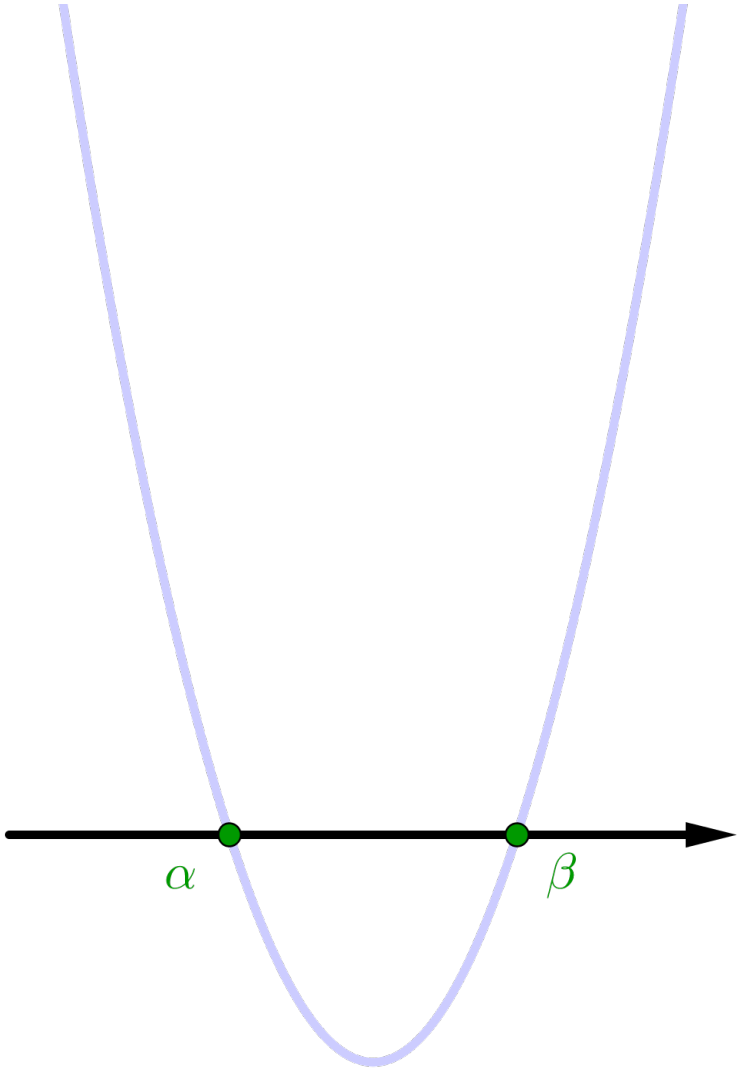
$$x = \alpha, \beta \ (\alpha < \beta)$$

Start End



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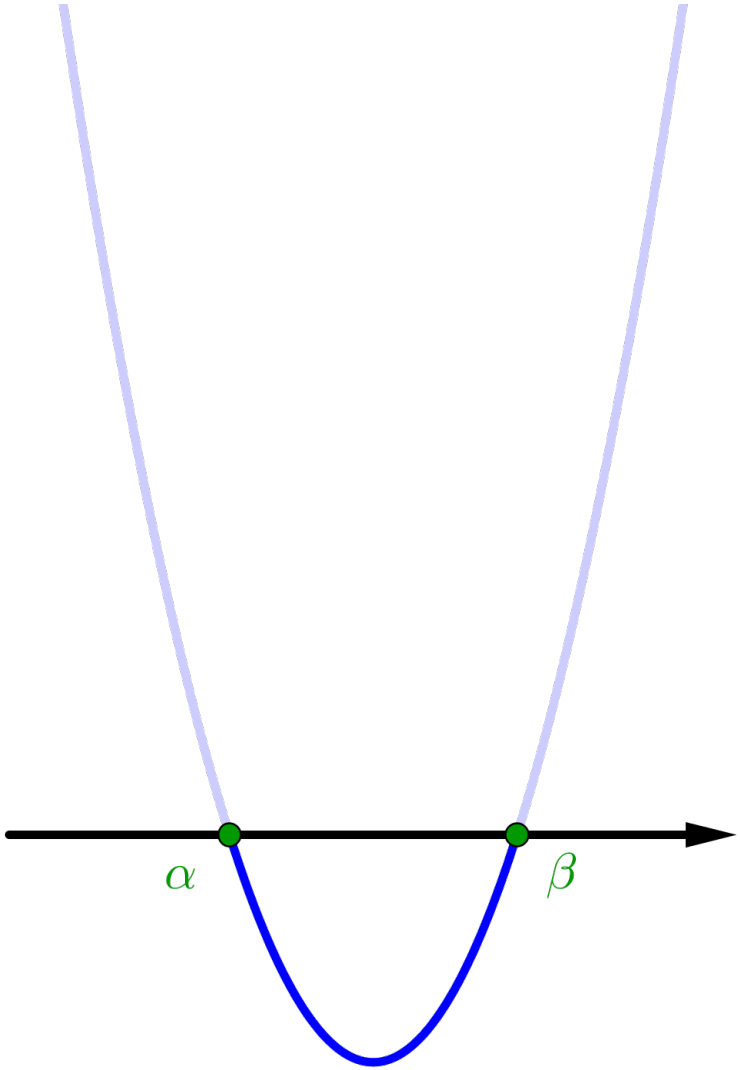
$$ax^2 + bx + c < 0$$

Start End



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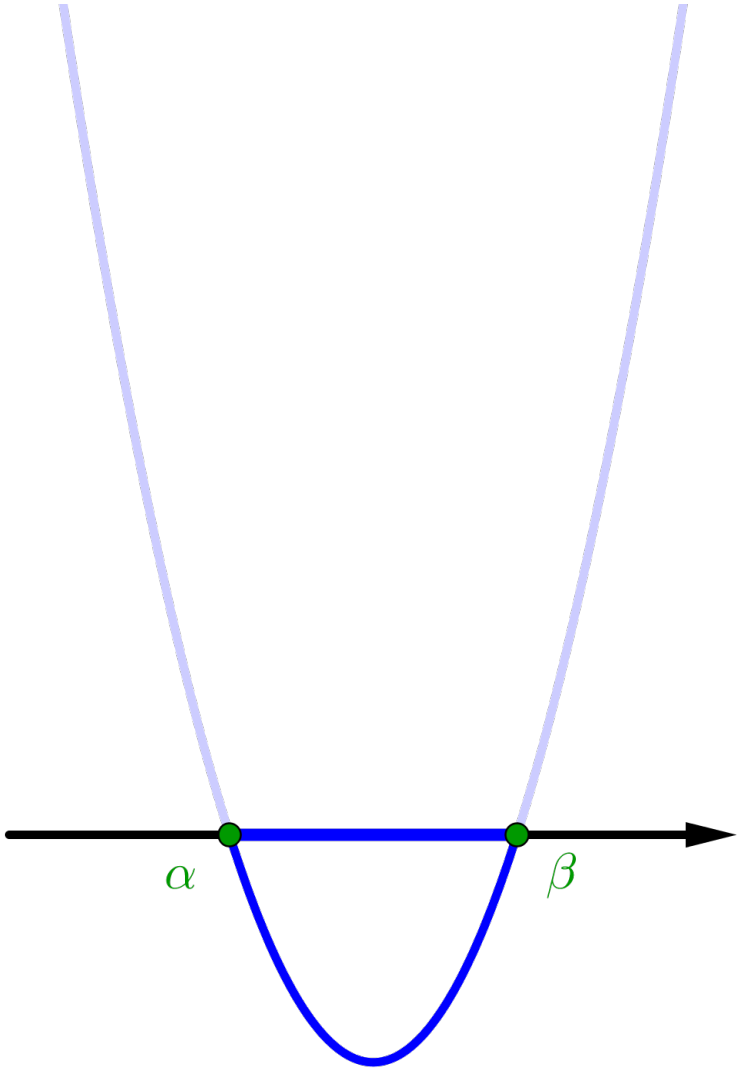

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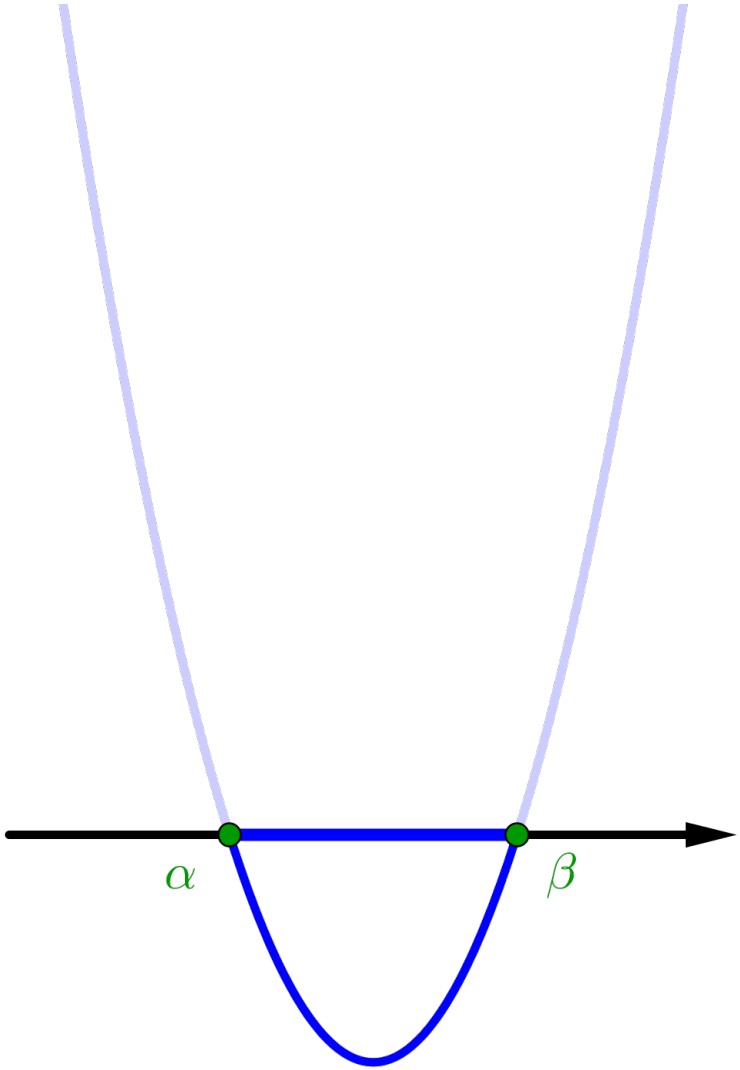

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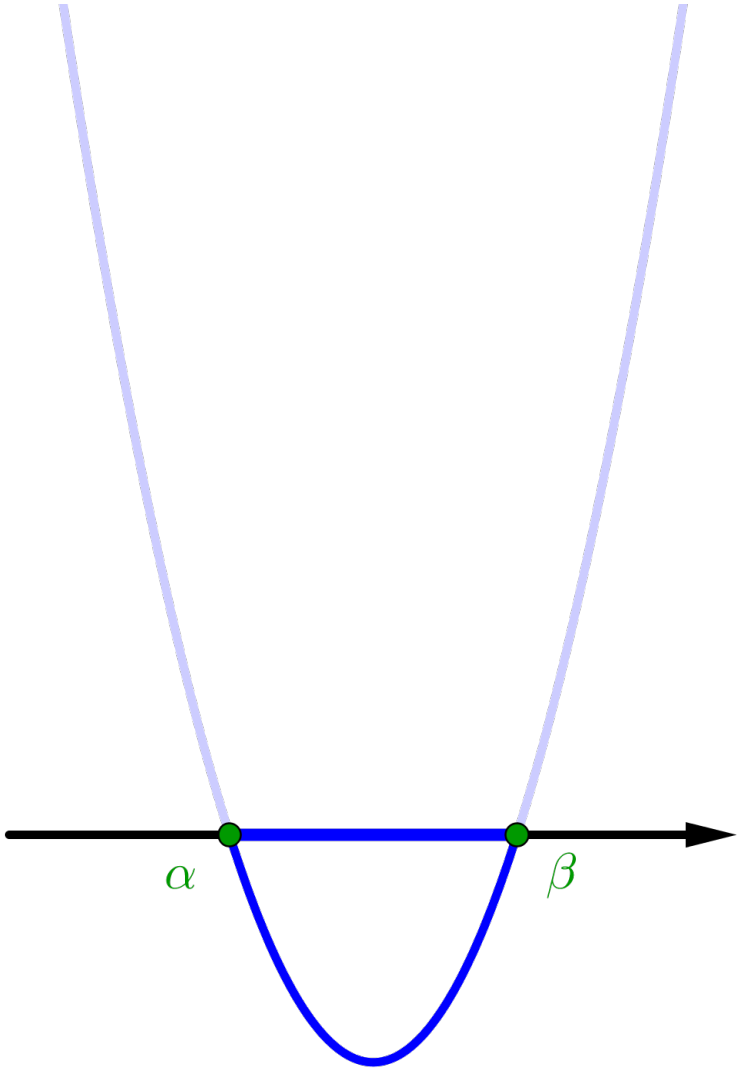
Start End



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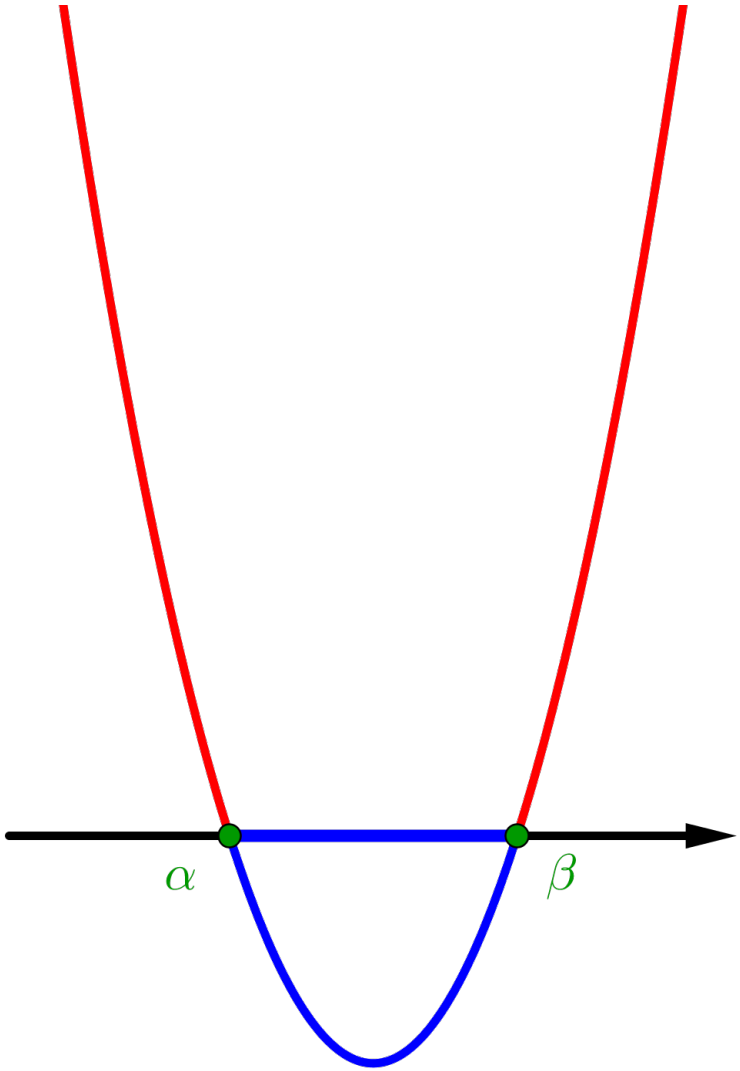

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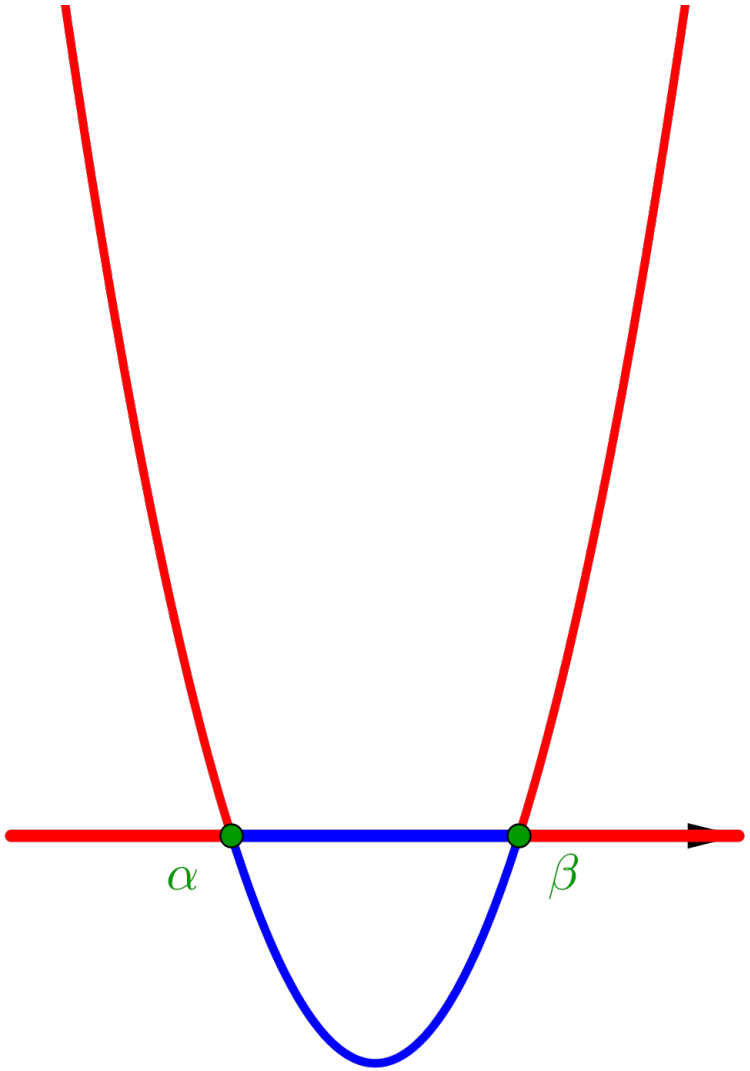

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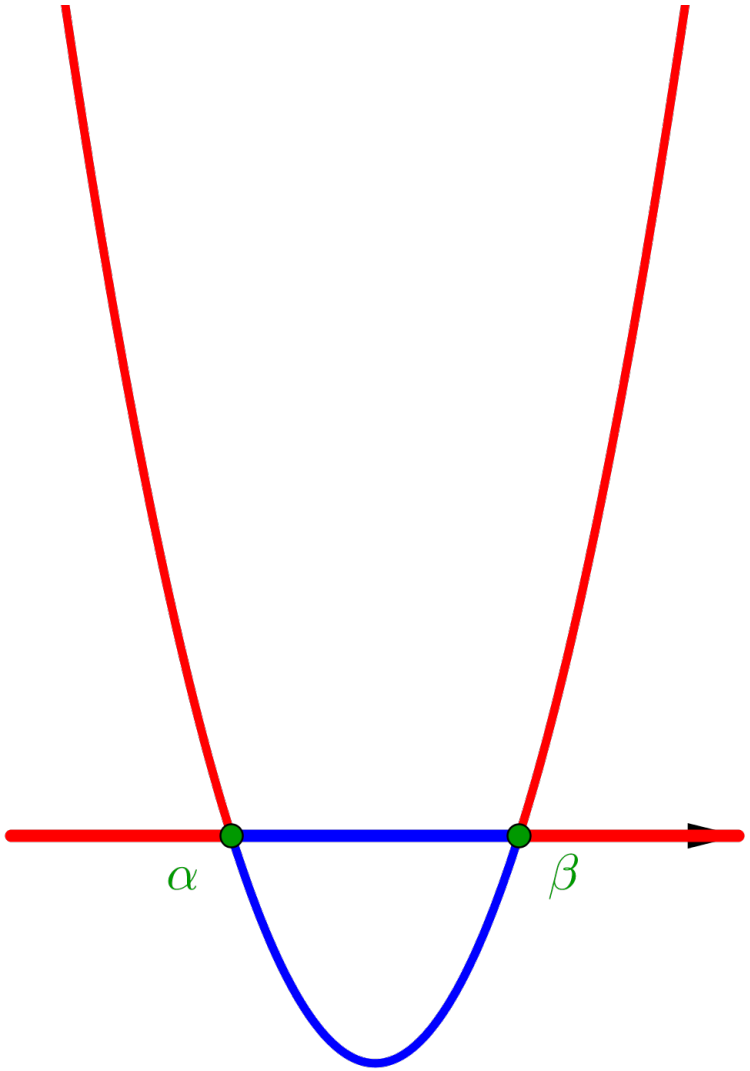

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$ax^2 + bx + c < 0$ $\quad$ $ax^2 + bx + c > 0$

$\alpha < x < \beta$ $\quad$ $x < \alpha \ or \ x > \beta$

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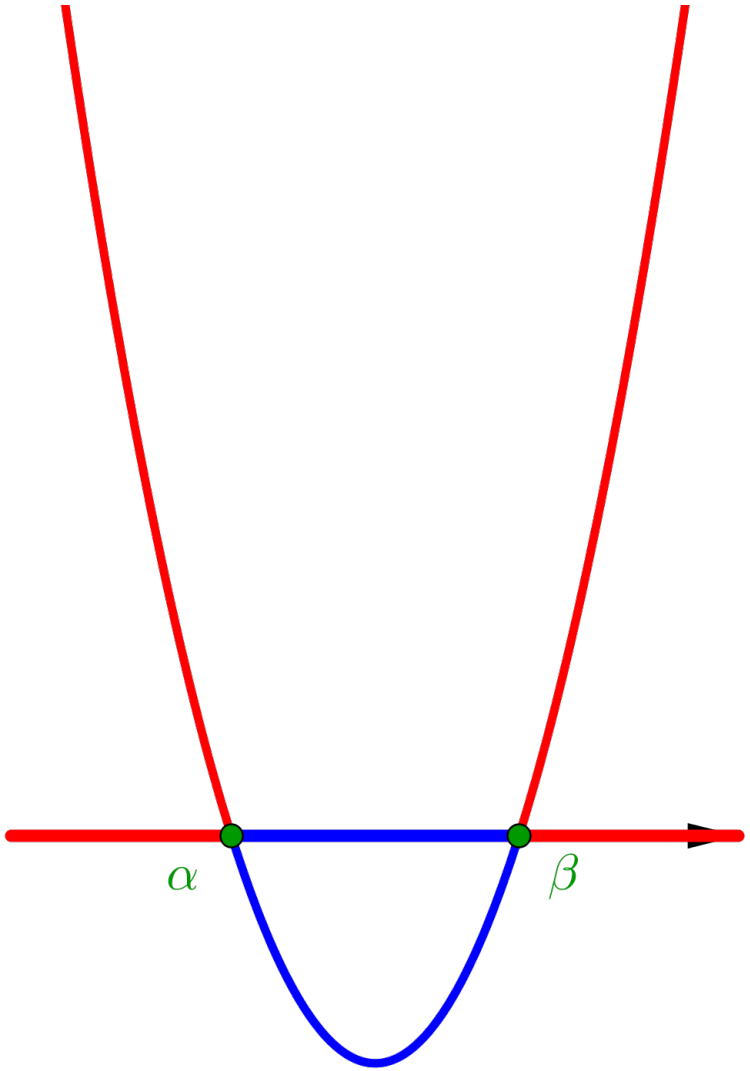

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$$ax^2 + bx + c \leq 0$$

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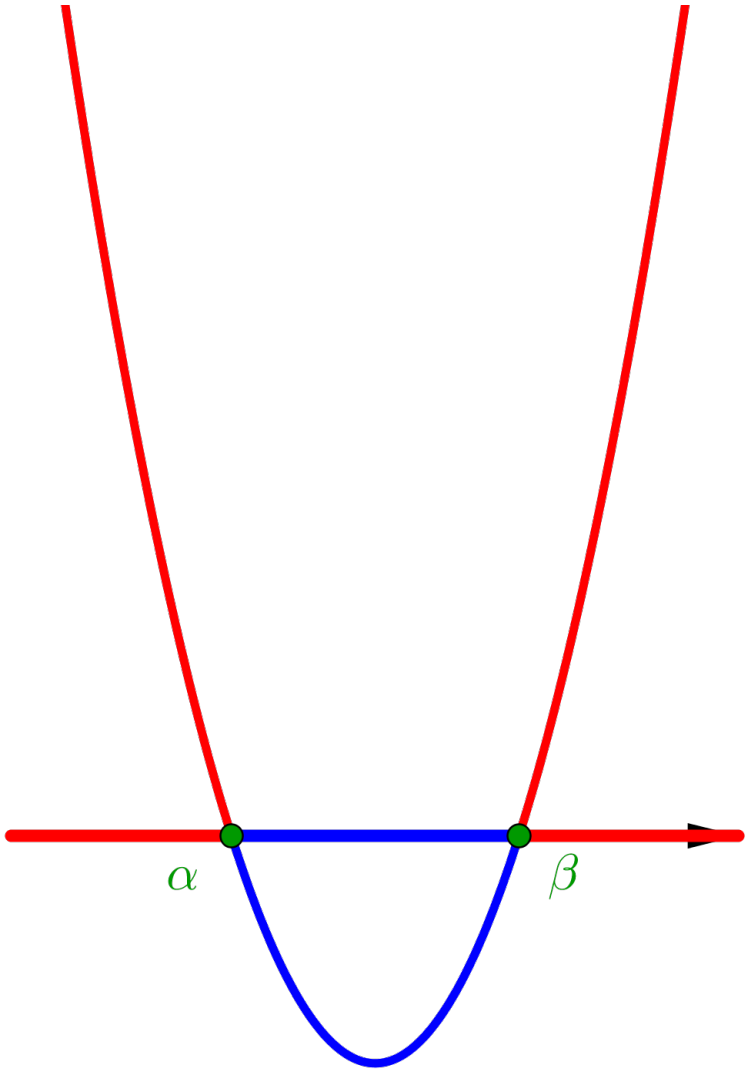

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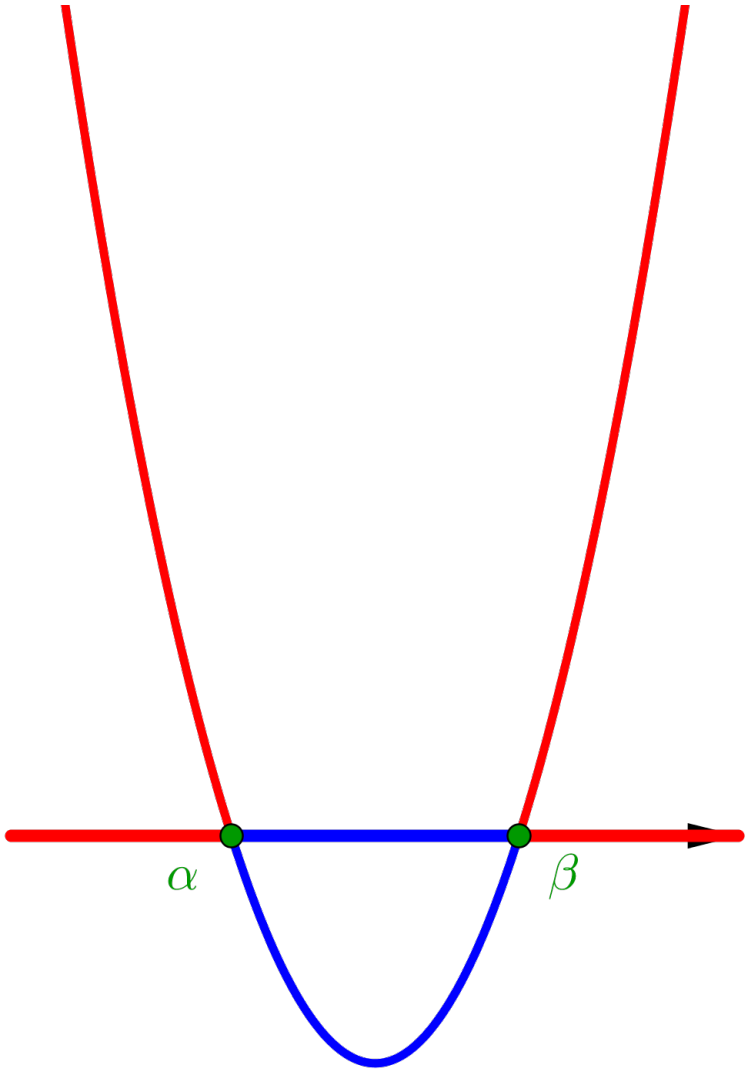
$$ax^2 + bx + c \leq 0$$

$$\alpha \leq x \leq \beta$$

Start End



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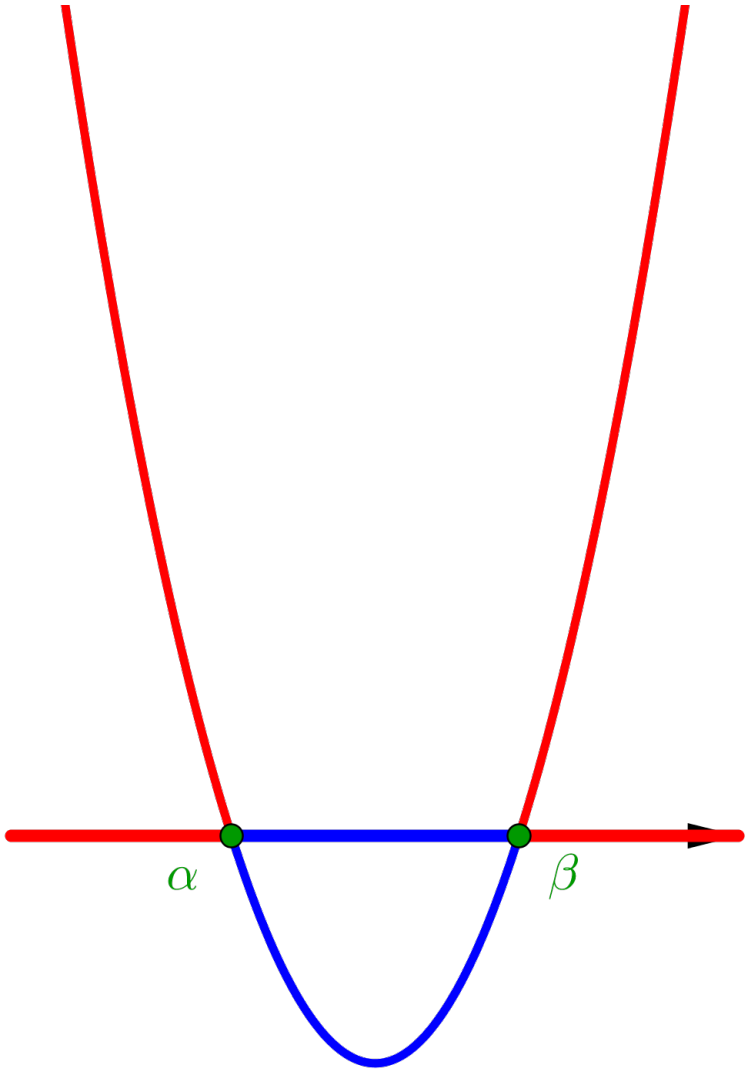

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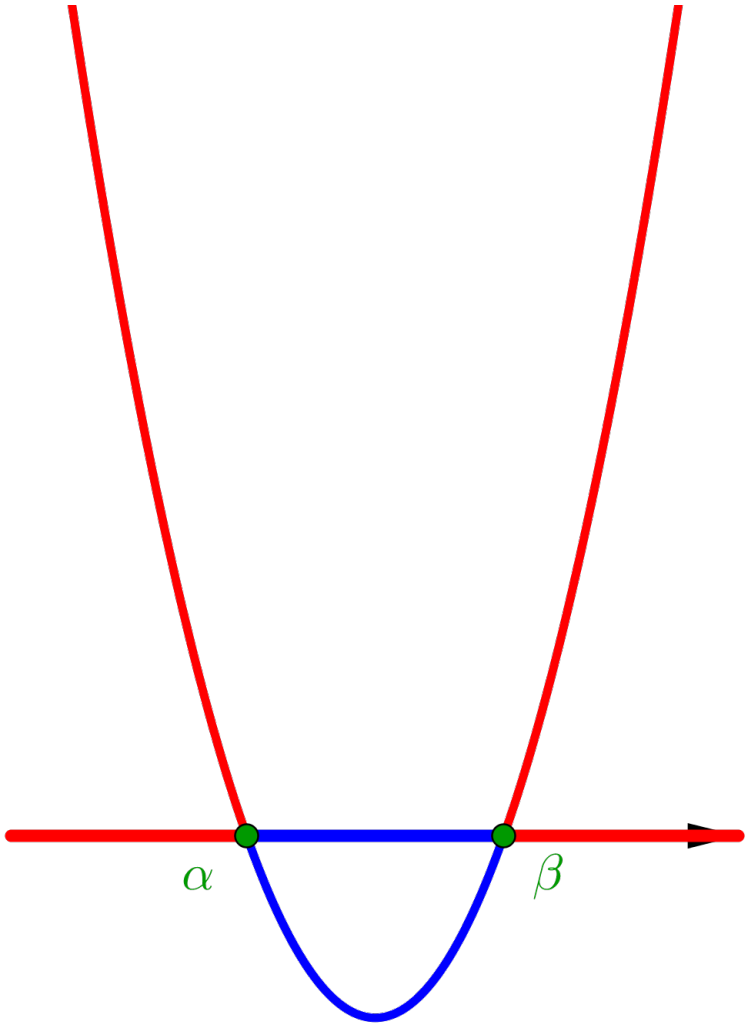

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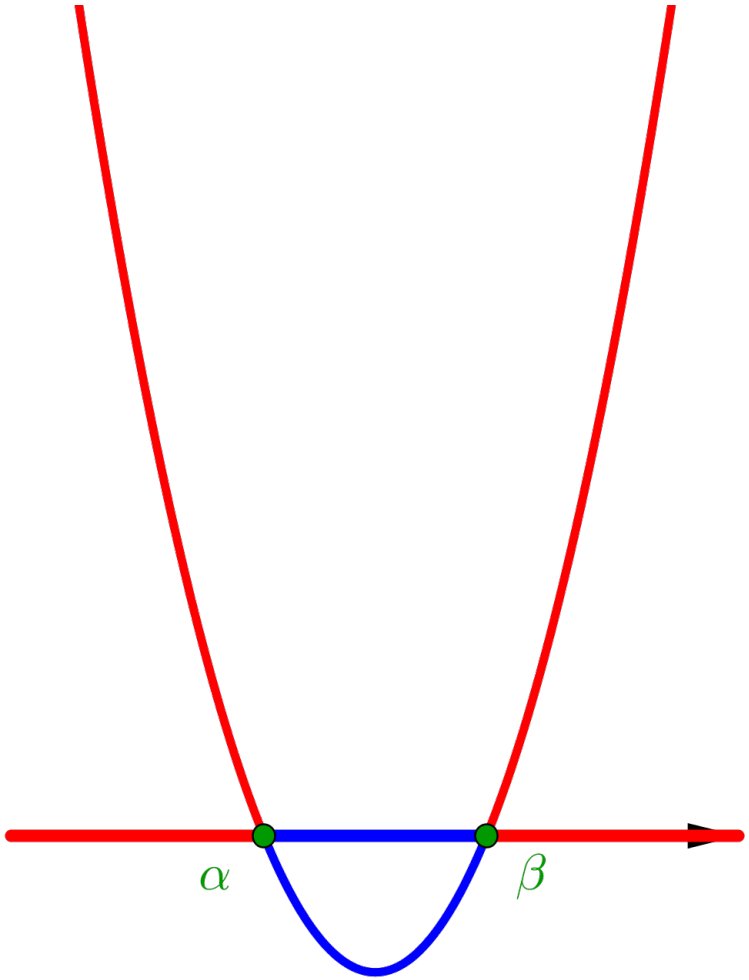


D = 1.5

$$y = ax^2 + bx + c \ (a > 0, \ b, c \in R)$$

$$D = b^2 - 4ac > 0$$

$$ax^2 + bx + c = 0$$

$$x = \alpha, \beta \ (\alpha < \beta)$$

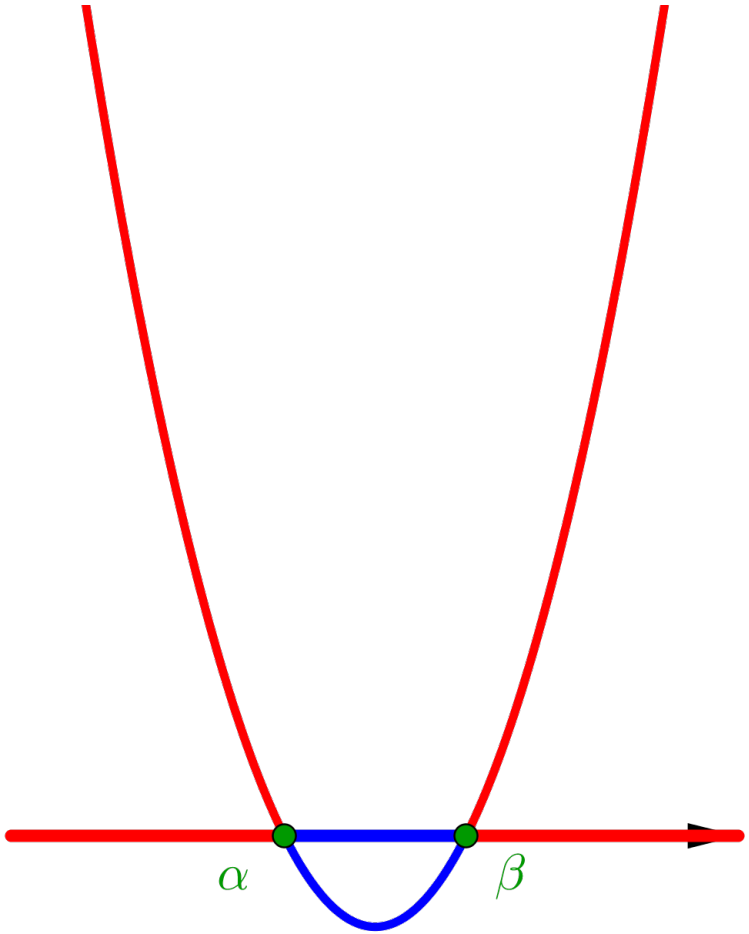
$ax^2 + bx + c < 0$ $\quad$ $ax^2 + bx + c > 0$

$\alpha < x < \beta$ $\quad$ $x < \alpha \ or \ x > \beta$

$ax^2 + bx + c \leq 0$ $\quad$ $ax^2 + bx + c \geq 0$

$\alpha \leq x \leq \beta$ $\quad$ $x \leq \alpha \ or \ x \geq \beta$

Start End



D = 1

$$y = ax^2 + bx + c \ (a > 0, \ b, c \in R)$$

$$D = b^2 - 4ac > 0$$

$$ax^2 + bx + c = 0$$

$$x = \alpha, \beta \ (\alpha < \beta)$$

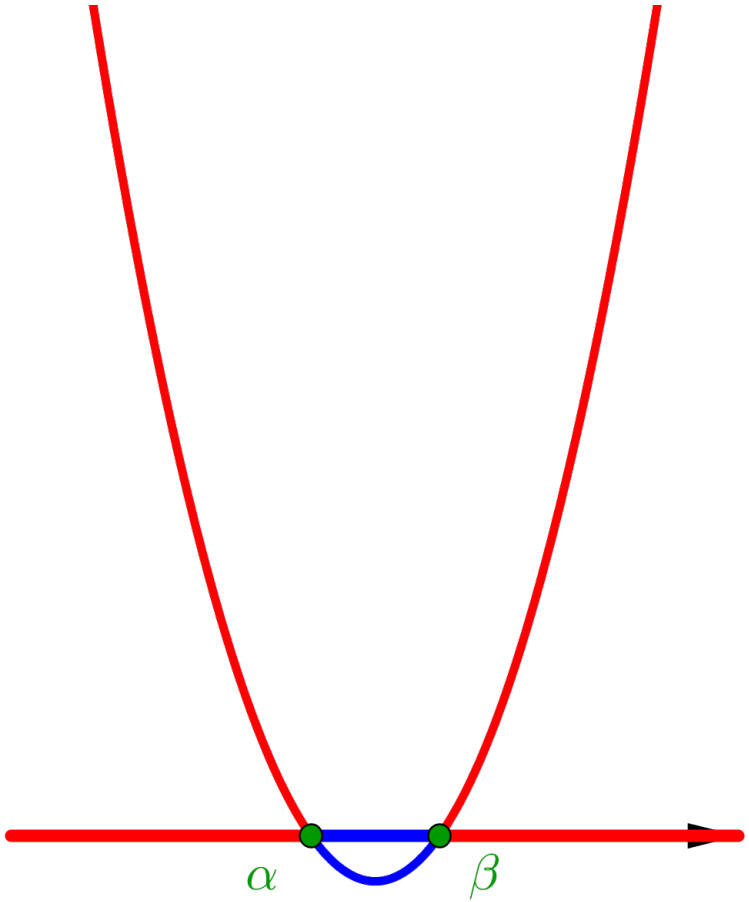
$ax^2 + bx + c < 0$ $\quad$ $ax^2 + bx + c > 0$

$\alpha < x < \beta$ $\quad$ $x < \alpha \ or \ x > \beta$

$ax^2 + bx + c \leq 0$ $\quad$ $ax^2 + bx + c \geq 0$

$\alpha \leq x \leq \beta$ $\quad$ $x \leq \alpha \ or \ x \geq \beta$

Start End



D = 0.5

$$y = ax^2 + bx + c \ (a > 0, \ b, c \in R)$$

$$D = b^2 - 4ac > 0$$

$$ax^2 + bx + c = 0$$

$$x = \alpha, \beta \ (\alpha < \beta)$$

$$ax^2 + bx + c < 0 \qquad ax^2 + bx + c > 0$$

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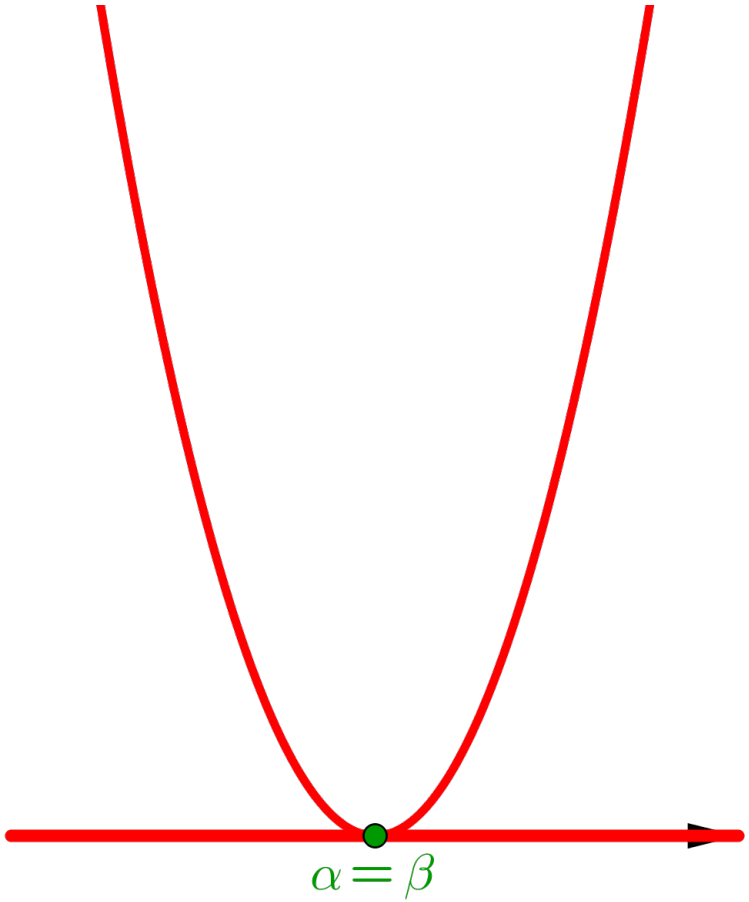


D = 0

$$y = ax^2 + bx + c \ (a > 0, \ b, c \in R)$$

$$D = b^2 - 4ac = 0$$

$$ax^2 + bx + c = 0$$

$$x = -\frac{b}{2a} = \alpha (= \beta)$$

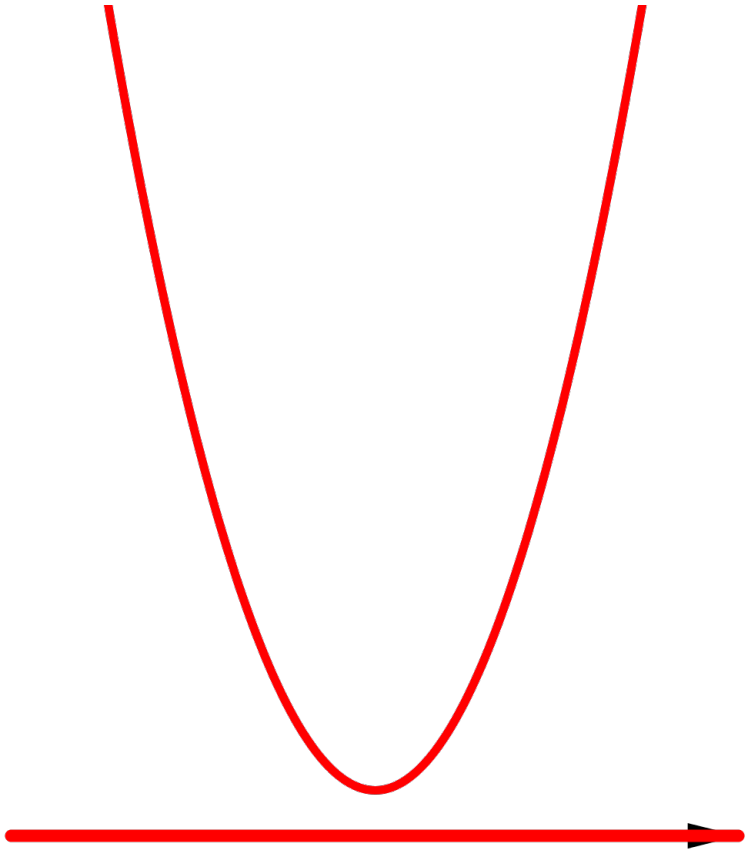
$ax^2 + bx + c < 0$ No real solutions.

$ax^2 + bx + c > 0$ $x \neq -\frac{b}{2a}$

$ax^2 + bx + c \leq 0$ $x = -\frac{b}{2a}$

$ax^2 + bx + c \geq 0$ $\mathbb{R}$

Start End



D = -0.5

$$y = ax^2 + bx + c \ (a > 0,\ b, c \in R)$$

$$D = b^2 - 4ac < 0$$

$$ax^2 + bx + c = 0$$

No real solutions.

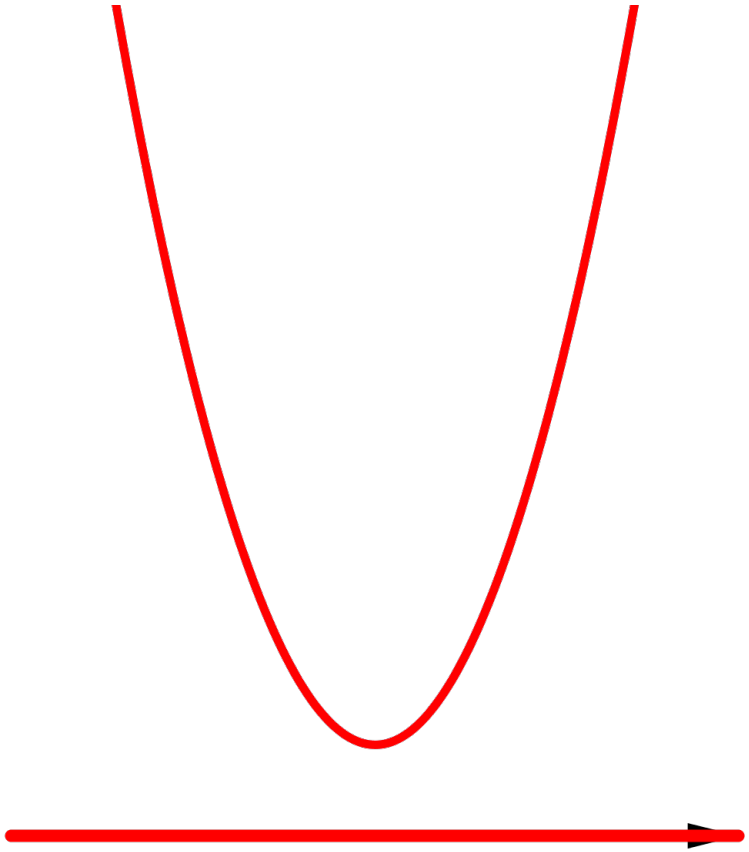
$ax^2 + bx + c < 0$ $ax^2 + bx + c > 0$

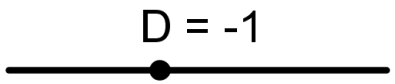
No real solutions. $\mathbb{R}$

$ax^2 + bx + c \leq 0$ $ax^2 + bx + c \geq 0$

No real solutions. $\mathbb{R}$

Start End





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$$D = b^2 - 4ac < 0$$

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No real solutions.

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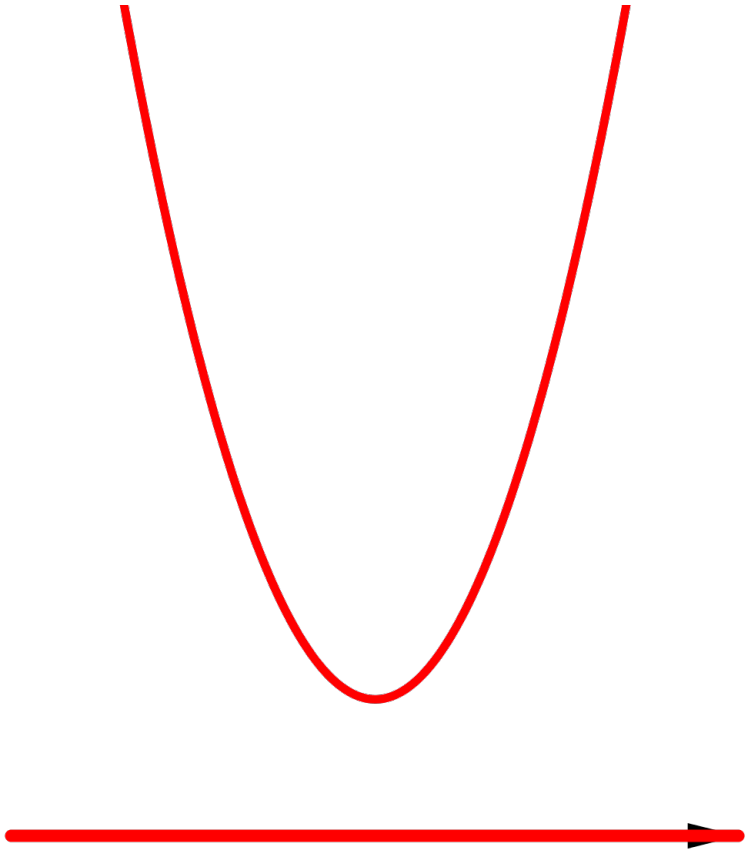

D = -1.5

$$y = ax^2 + bx + c \ (a > 0,\ b, c \in R)$$

$$D = b^2 - 4ac < 0$$

$$ax^2 + bx + c = 0$$

No real solutions.

$ax^2 + bx + c < 0$ $ax^2 + bx + c > 0$

No real solutions. $\mathbb{R}$

$ax^2 + bx + c \leq 0$ $ax^2 + bx + c \geq 0$

No real solutions. $\mathbb{R}$

Github:
https://min7014.github.io/math20210522001.html

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and you can see a picture moving.