부등식을 그래프로 풀기($f(x) < g(x)$)

(Solve Inequalities with a Graph($f(x) < g(x)$))

Solve Inequalities with a Graph($f(x) < g(x)$)

Start End

Start End

$$f(x) < g(x)$$

$$f(x) < y < g(x)$$

Start End

$$f(x) < g(x)$$

$$f(x) < y < g(x)$$

$$f(x) < g(x)$$

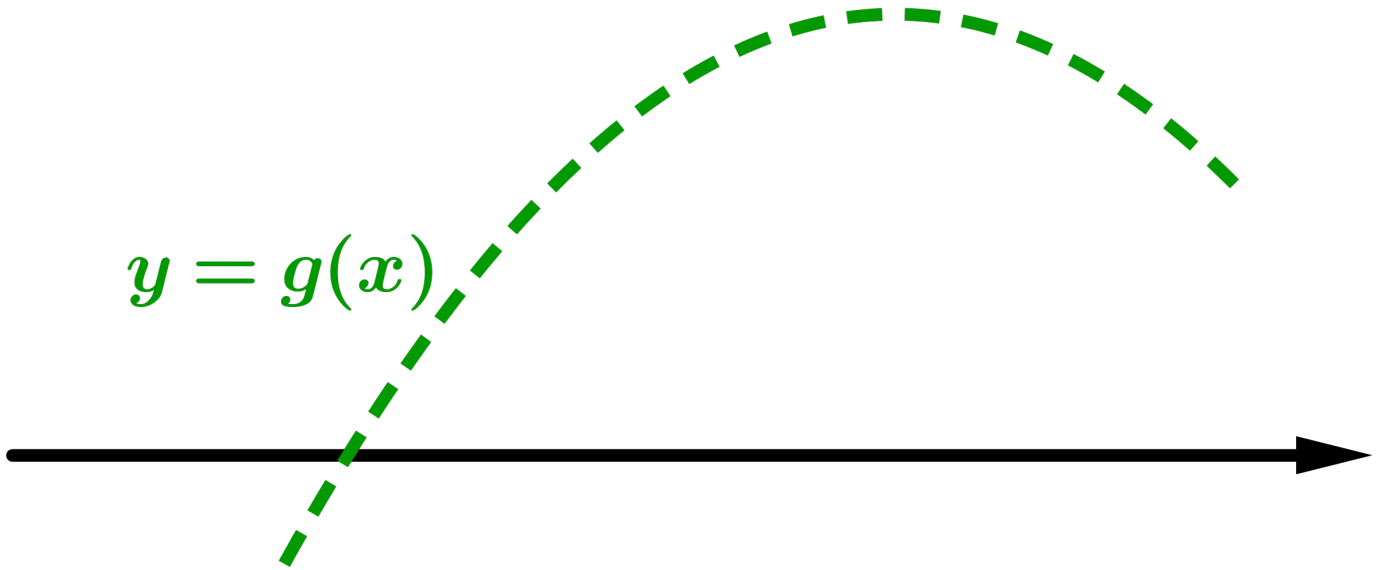
$$f(x) < y < g(x)$$

$$y = g(x)$$

Start End

$$f(x) < g(x)$$

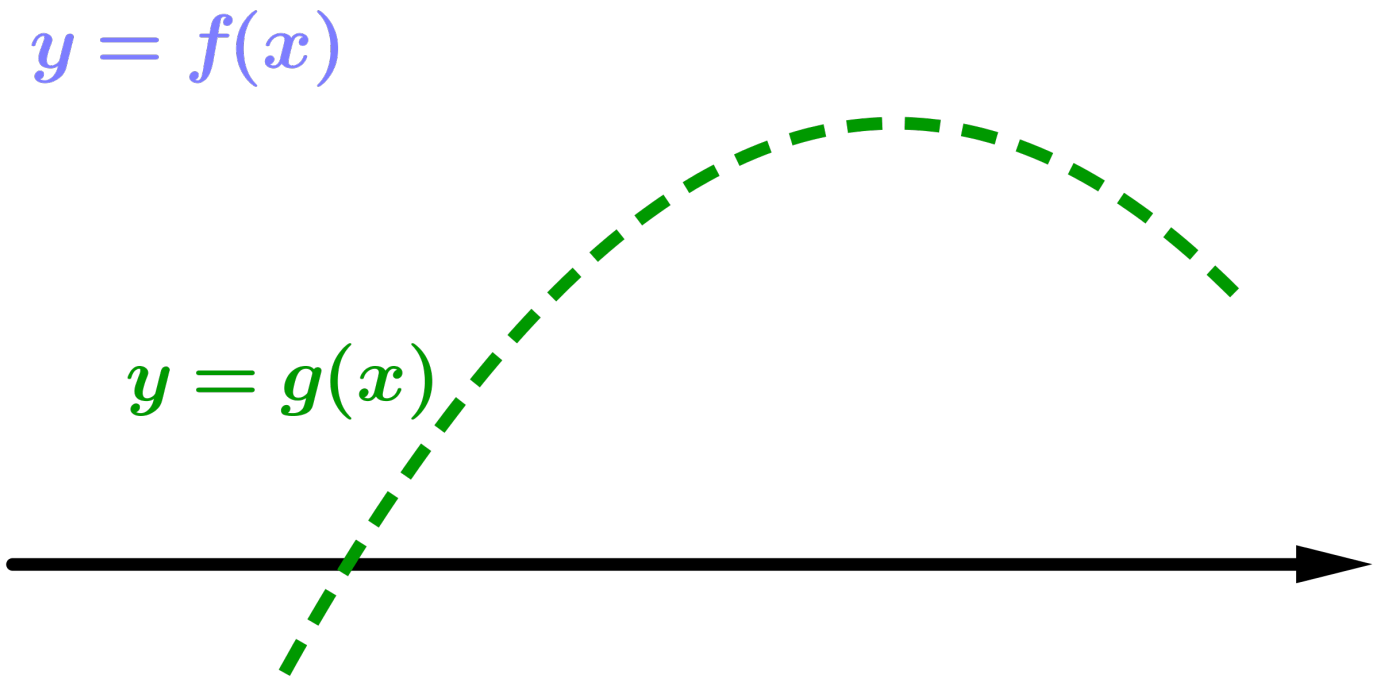
$$f(x) < y < g(x)$$



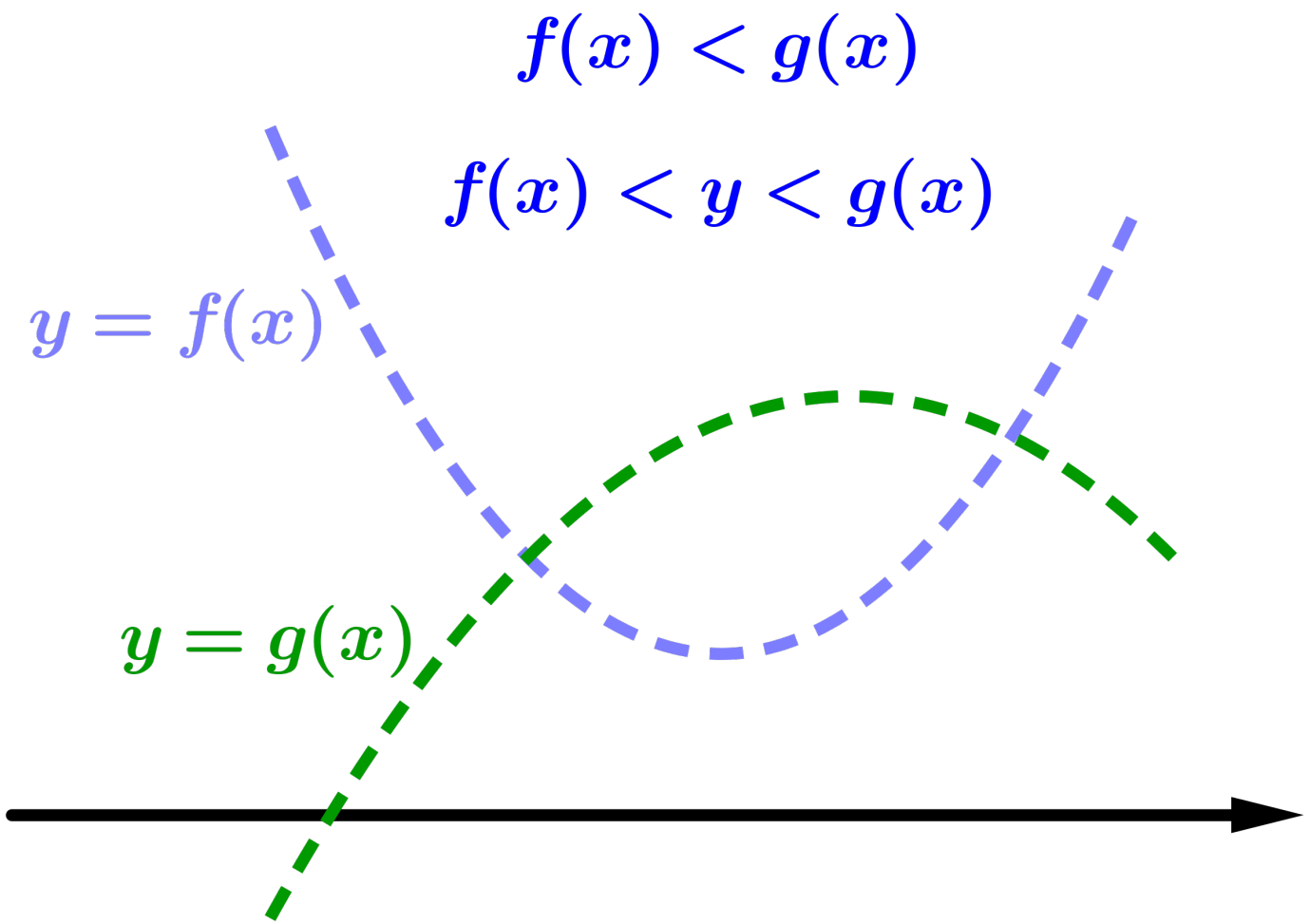
Start End

$$f(x) < g(x)$$

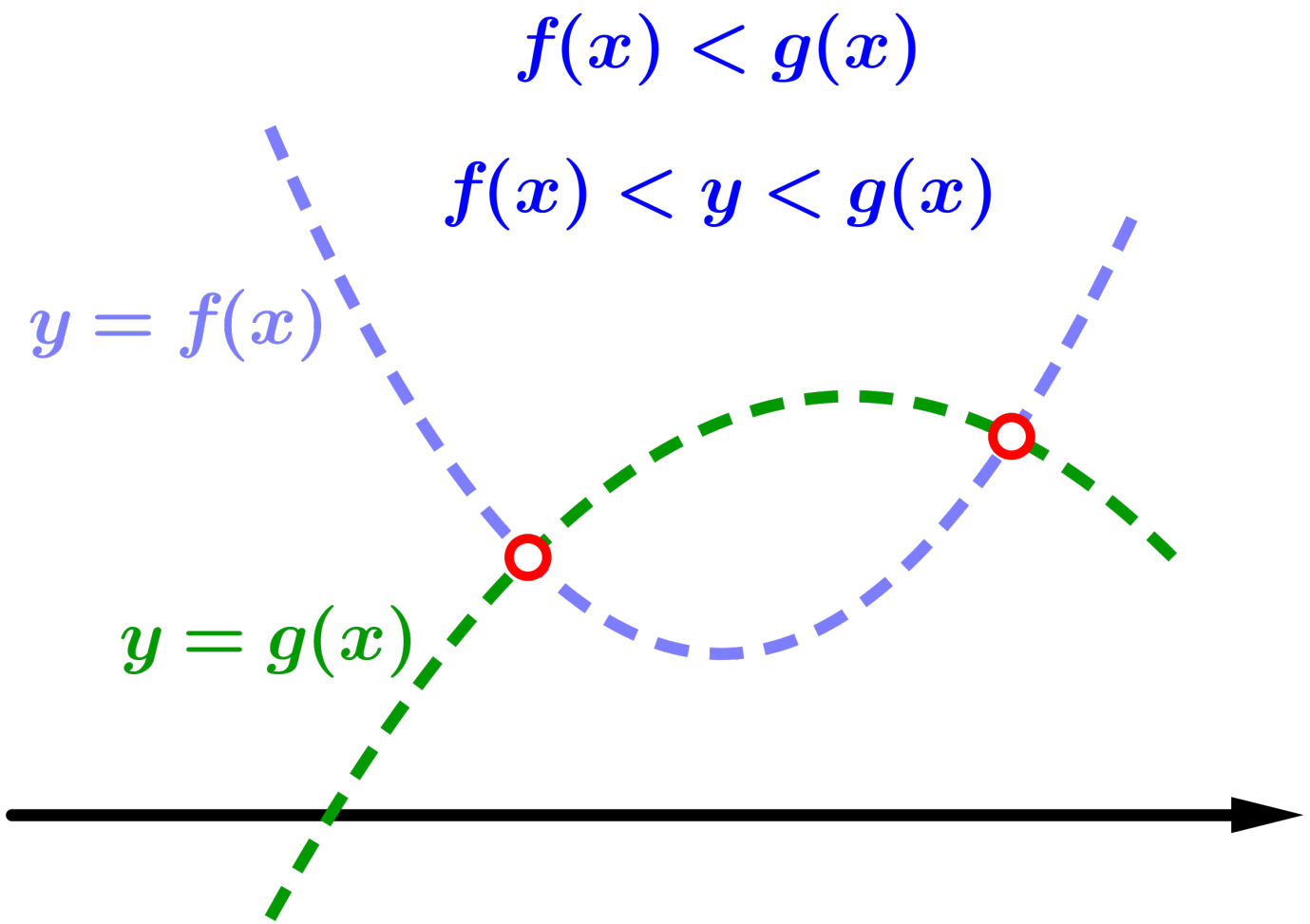
$$f(x) < y < g(x)$$



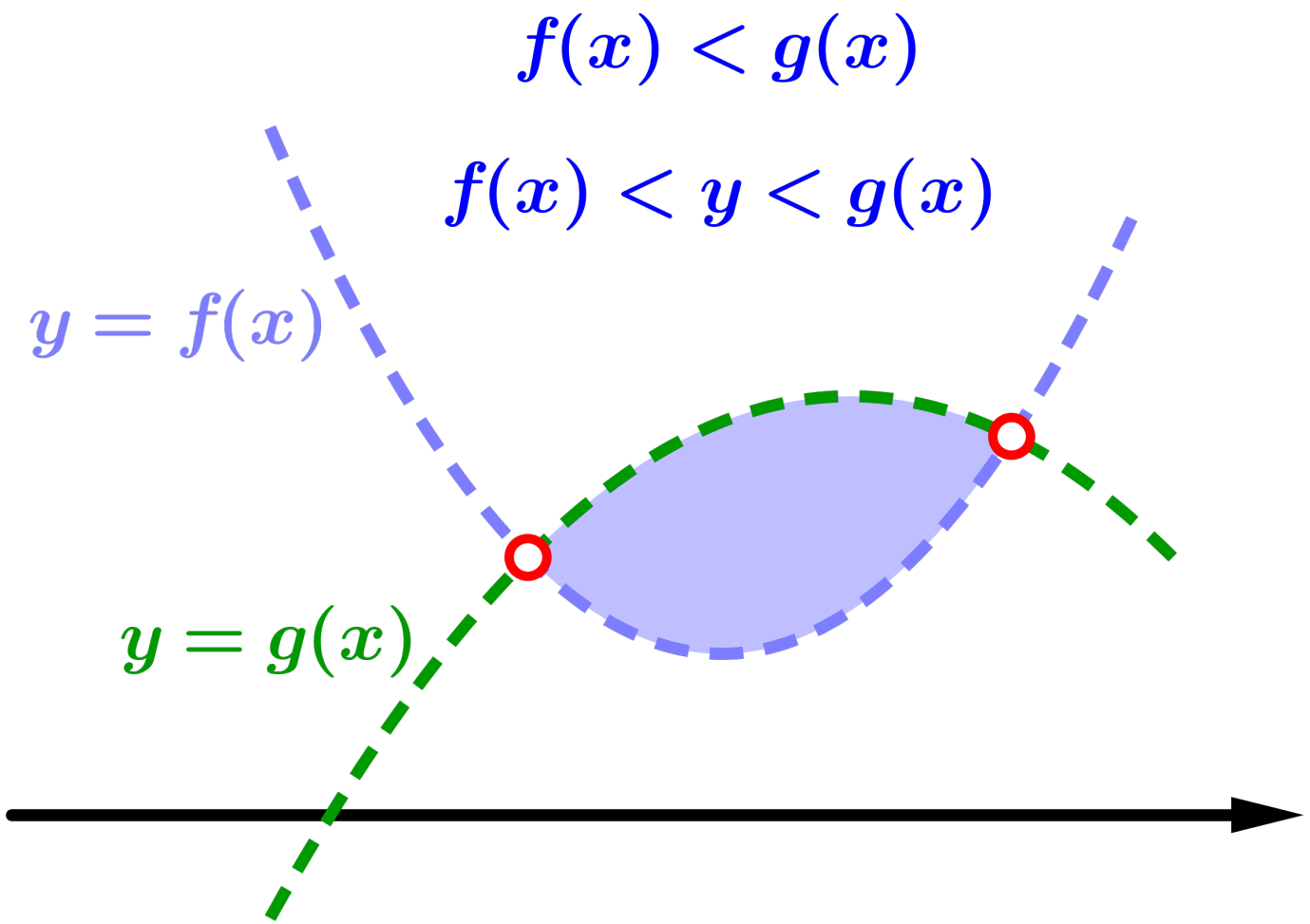
Start End



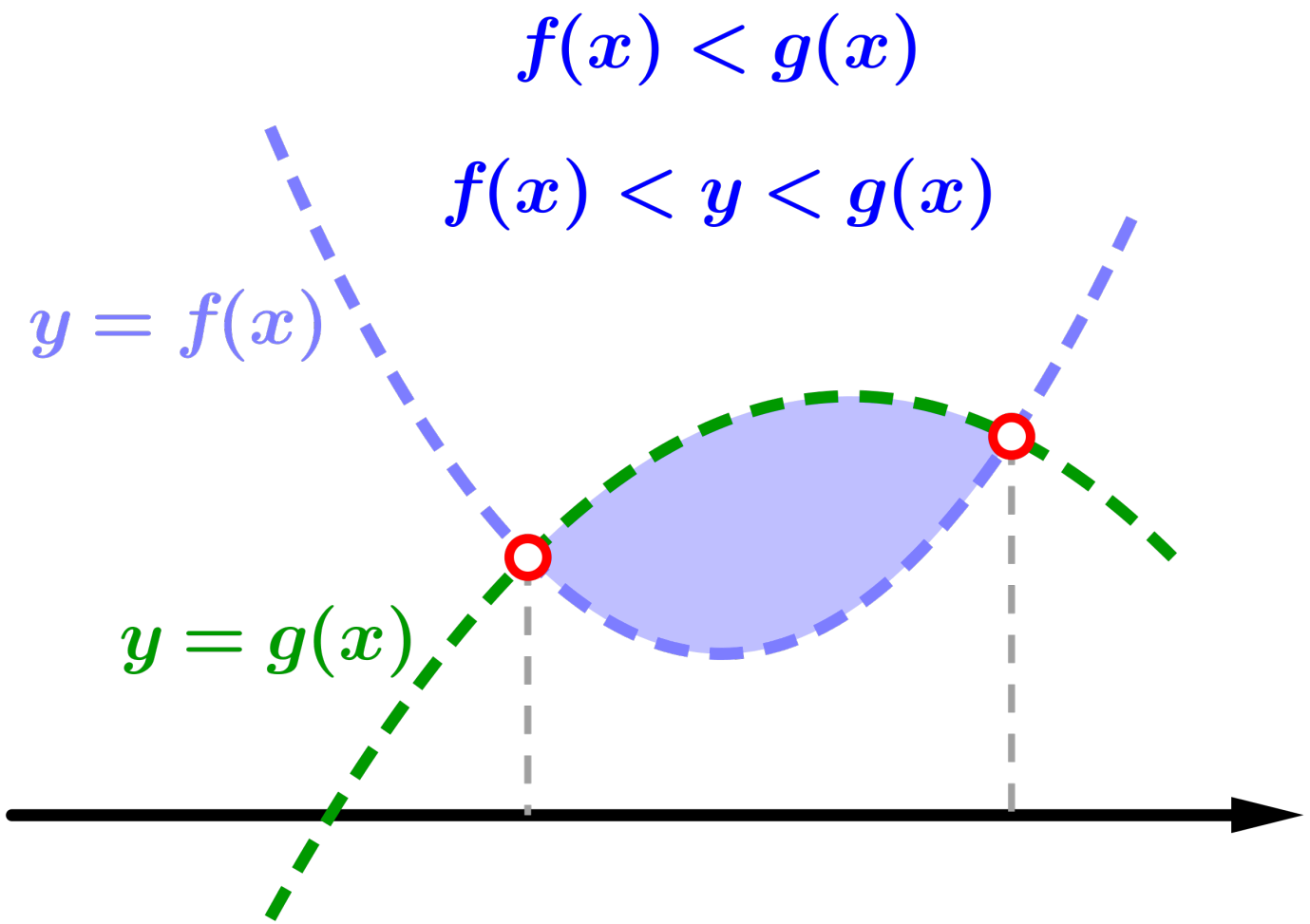
Start End



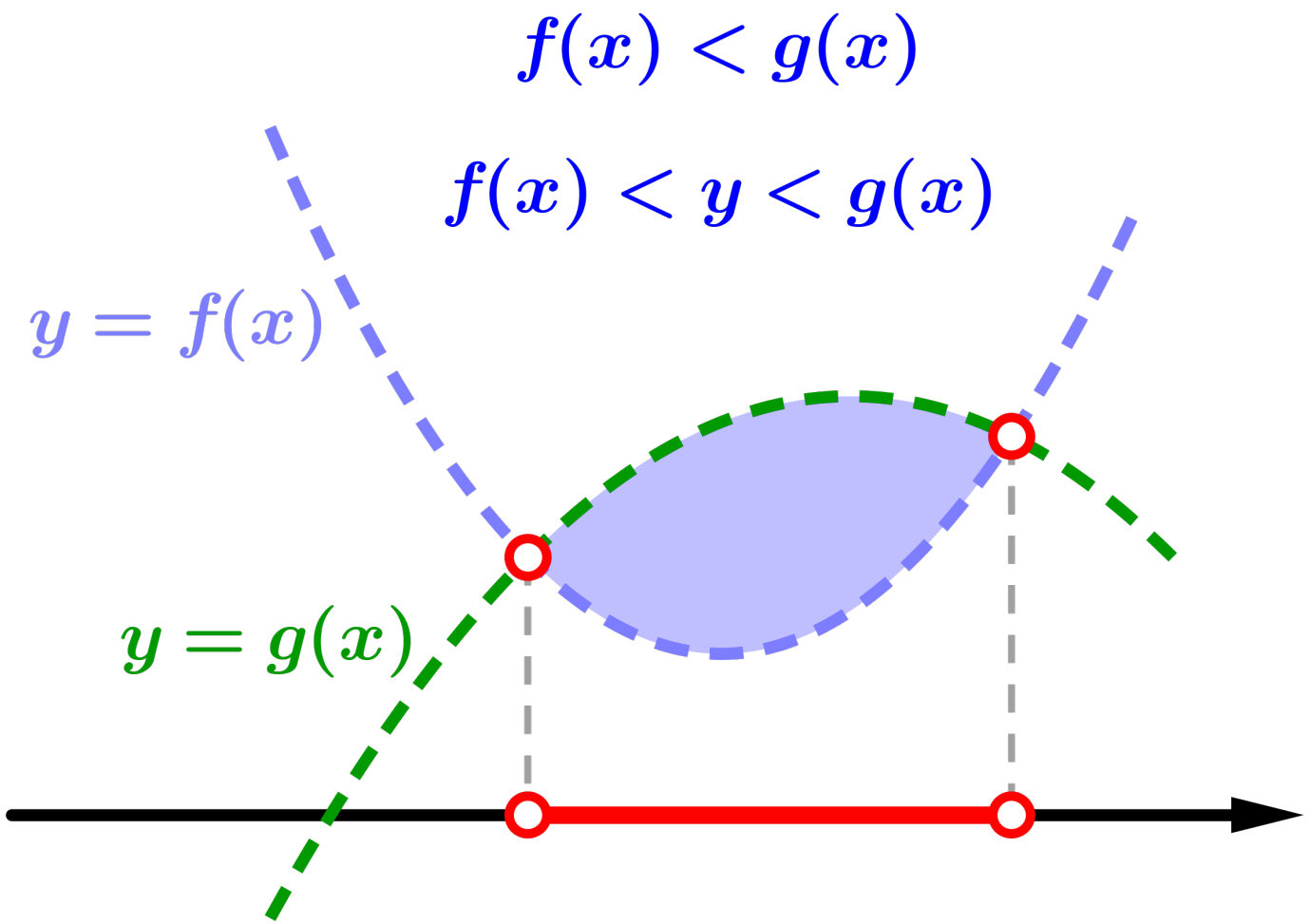
Start End



Start End



Start End



Solve Inequalities with a Graph($f(x) < g(x)$)

$$x_0 \in \{x \mid f(x) < g(x)\}$$

$$x_0 \in \{x \mid f(x) < g(x)\} \quad \Leftrightarrow \quad f(x_0) < g(x_0)$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < g(x)\} \quad &\Leftrightarrow \quad f(x_0) < g(x_0) \\
&\Leftrightarrow \quad f(x_0) < \frac{f(x_0) + g(x_0)}{2} < g(x_0)
\end{aligned}
$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < g(x)\} \quad &\Leftrightarrow \quad f(x_0) < g(x_0) \\
&\Leftrightarrow \quad f(x_0) < \frac{f(x_0) + g(x_0)}{2} < g(x_0) \\
&\Rightarrow \quad x_0 \in \{x \mid f(x) < y < g(x)\}
\end{aligned}
$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < g(x)\} &\Leftrightarrow f(x_0) < g(x_0) \\
&\Leftrightarrow f(x_0) < \frac{f(x_0) + g(x_0)}{2} < g(x_0) \\
&\Rightarrow x_0 \in \{x \mid f(x) < y < g(x)\} \\
\{x \mid f(x) < g(x)\} &\subset \{x \mid f(x) < y < g(x)\}
\end{aligned}
$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < g(x)\} &\Leftrightarrow f(x_0) < g(x_0) \\
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\{x \mid f(x) < g(x)\} &\subset \{x \mid f(x) < y < g(x)\}
\end{aligned}
$$

$$x_0 \in \{x \mid f(x) < y < g(x)\}$$

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\begin{aligned}
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\{x \mid f(x) < g(x)\} &\subset \{x \mid f(x) < y < g(x)\}
\end{aligned}
$$

$$
x_0 \in \{x \mid f(x) < y < g(x)\} \Leftrightarrow f(x_0) < y_0 < g(x_0)
$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < g(x)\} &\Leftrightarrow f(x_0) < g(x_0) \\
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\{x \mid f(x) < g(x)\} &\subset \{x \mid f(x) < y < g(x)\}
\end{aligned}
$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < y < g(x)\} &\Leftrightarrow f(x_0) < y_0 < g(x_0) \\
&\Rightarrow f(x_0) < g(x_0)
\end{aligned}
$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < g(x)\} &\Leftrightarrow f(x_0) < g(x_0) \\
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\{x \mid f(x) < g(x)\} &\subset \{x \mid f(x) < y < g(x)\}
\end{aligned}
$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < y < g(x)\} &\Leftrightarrow f(x_0) < y_0 < g(x_0) \\
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&\Leftrightarrow x_0 \in \{x \mid f(x) < g(x)\}
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$$

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x_0 \in \{x \mid f(x) < g(x)\} &\Leftrightarrow f(x_0) < g(x_0) \\
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\end{aligned}
$$

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\begin{aligned}
x_0 \in \{x \mid f(x) < y < g(x)\} &\Leftrightarrow f(x_0) < y_0 < g(x_0) \\
&\Rightarrow f(x_0) < g(x_0) \\
&\Leftrightarrow x_0 \in \{x \mid f(x) < g(x)\} \\
\{x \mid f(x) < y < g(x)\} &\subset \{x \mid f(x) < g(x)\}
\end{aligned}
$$

$$\therefore$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < g(x)\} &\Leftrightarrow f(x_0) < g(x_0) \\
&\Leftrightarrow f(x_0) < \frac{f(x_0) + g(x_0)}{2} < g(x_0) \\
&\Rightarrow x_0 \in \{x \mid f(x) < y < g(x)\} \\
\{x \mid f(x) < g(x)\} &\subset \{x \mid f(x) < y < g(x)\}
\end{aligned}
$$

$$
\begin{aligned}
x_0 \in \{x \mid f(x) < y < g(x)\} &\Leftrightarrow f(x_0) < y_0 < g(x_0) \\
&\Rightarrow f(x_0) < g(x_0) \\
&\Leftrightarrow x_0 \in \{x \mid f(x) < g(x)\} \\
\{x \mid f(x) < y < g(x)\} &\subset \{x \mid f(x) < g(x)\}
\end{aligned}
$$

$$
\therefore \ \{x \mid f(x) < g(x)\} = \{x \mid f(x) < y < g(x)\}
$$

Github:
https://min7014.github.io/math20210602001.html

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and you can see a picture moving.