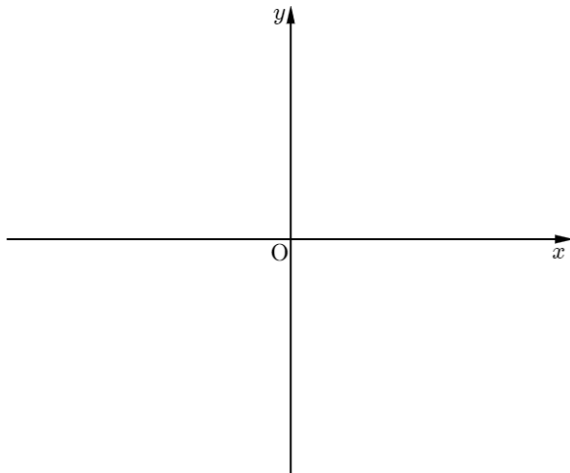


The hyperbolic equation when the two focal points are $(k, 0)$, $(-k, 0)$ and the difference in length is given by $2a$

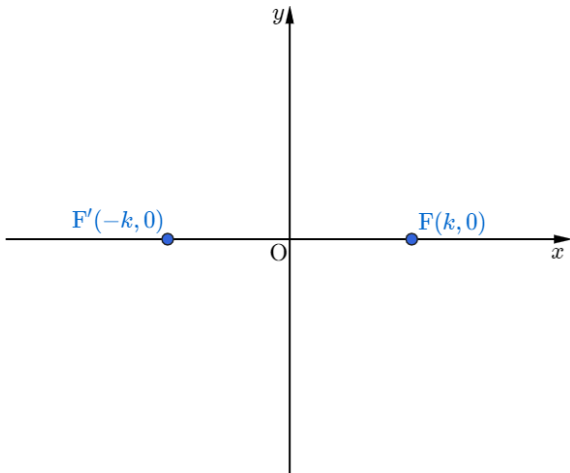
두 초점이 $(k, 0)$, $(-k, 0)$ 이고 길이의 차이가 $2a$ 로 주어 졌을 때 쌍곡선의 방정식

(The hyperbolic equation when the two focal points are $(k, 0)$, $(-k, 0)$ and the difference in length is given by $2a$)

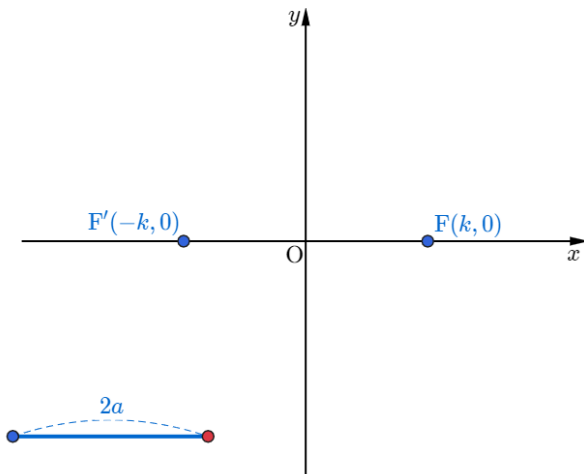
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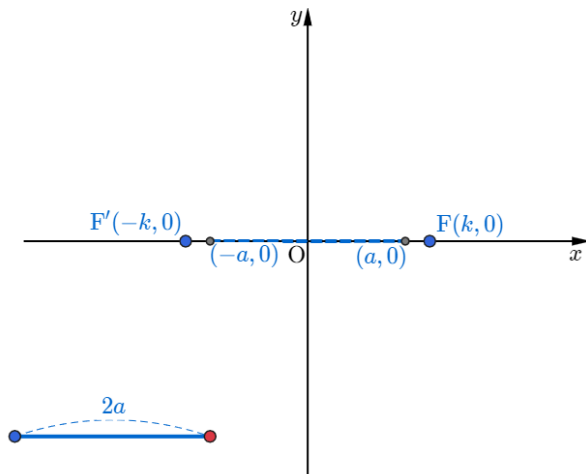
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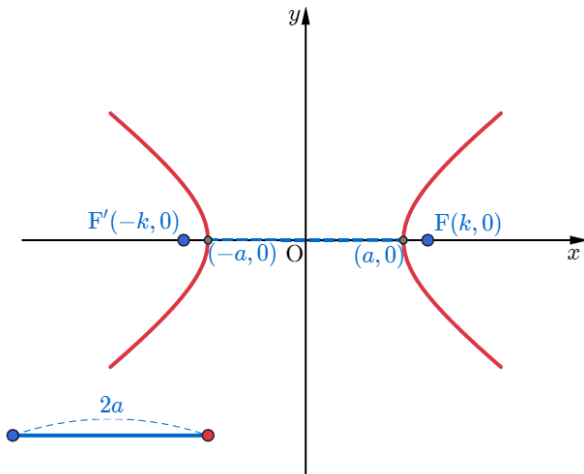
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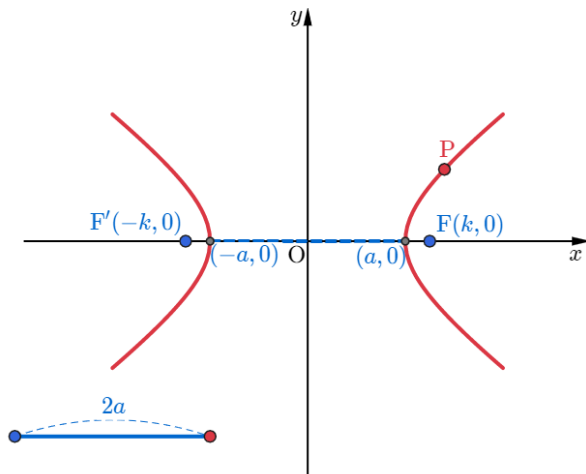
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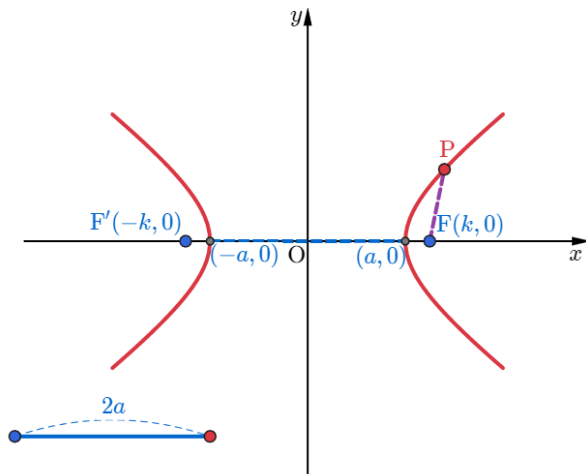
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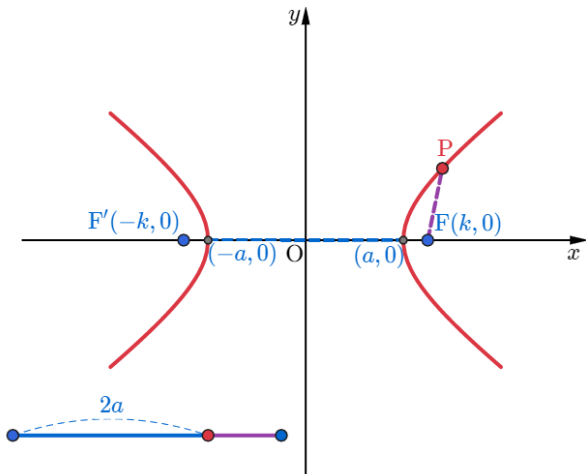
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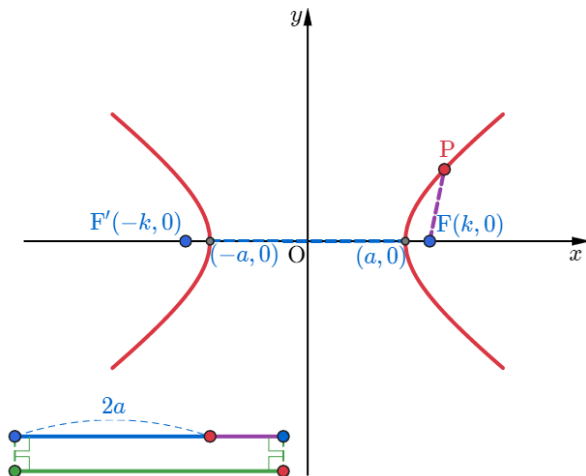
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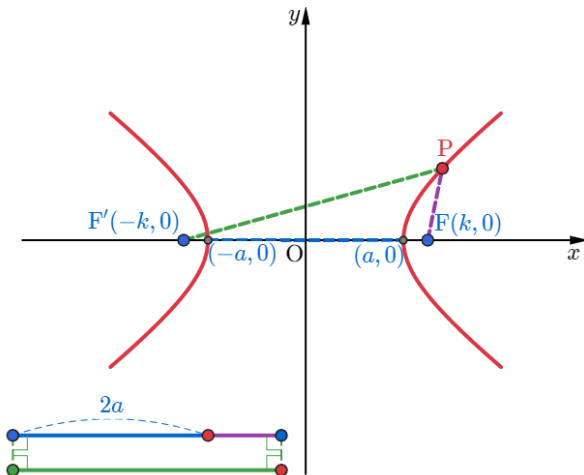
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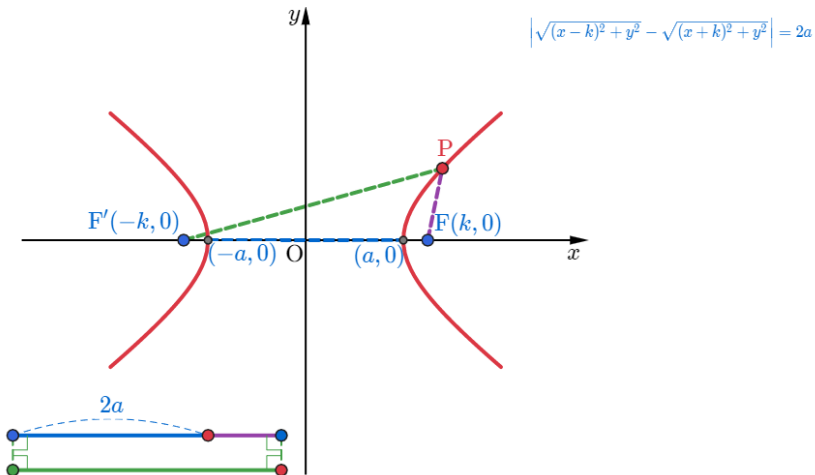
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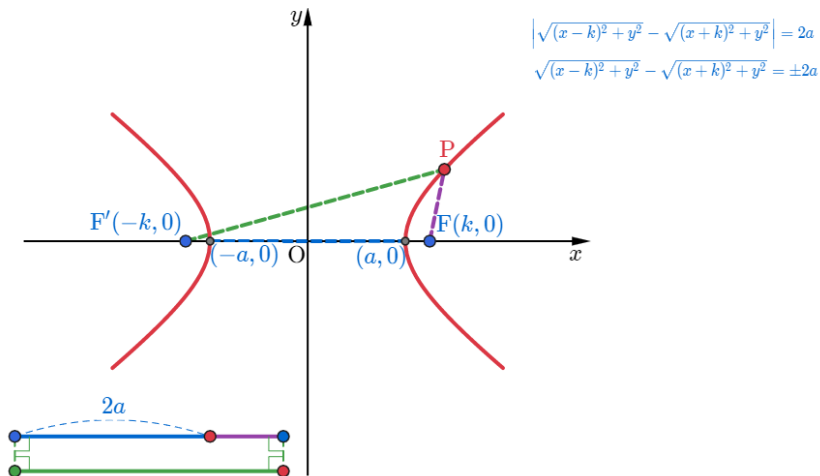
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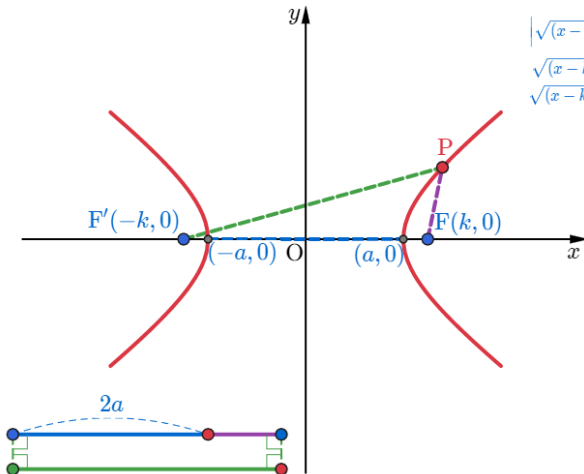
The hyperbolic equation when the two focal points are $(k, 0)$, $(-k, 0)$ and the difference in length is given by $2a$



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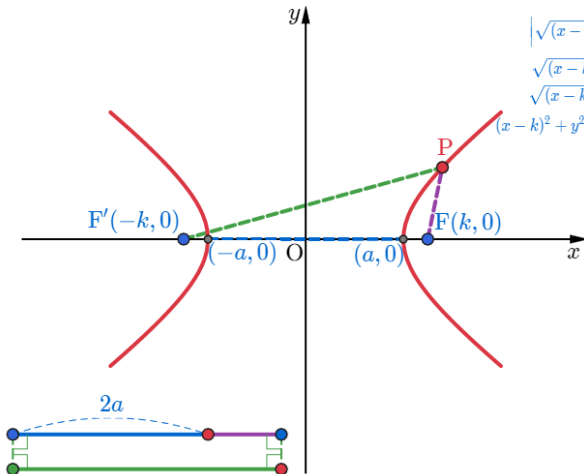


The hyperbolic equation when the two focal points are $(k, 0)$, $(-k, 0)$ and the difference in length is given by $2a$



$$\begin{aligned} |\sqrt{(x-k)^2 + y^2} - \sqrt{(x+k)^2 + y^2}| &= 2a \\ \sqrt{(x-k)^2 + y^2} - \sqrt{(x+k)^2 + y^2} &= \pm 2a \\ \sqrt{(x-k)^2 + y^2} &= \sqrt{(x+k)^2 + y^2} \pm 2a \end{aligned}$$

The hyperbolic equation when the two focal points are $(k, 0)$, $(-k, 0)$ and the difference in length is given by $2a$



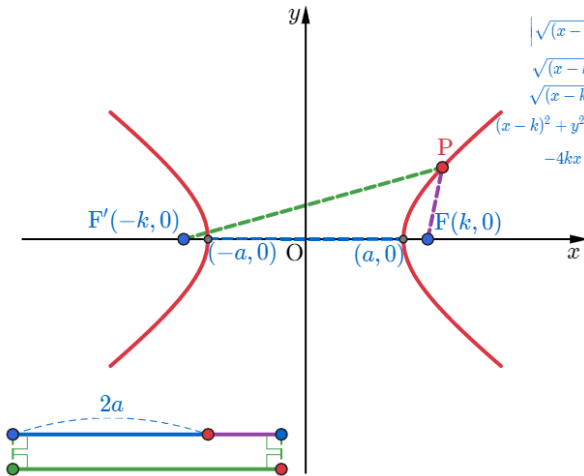
$$|\sqrt{(x-k)^2 + y^2} - \sqrt{(x+k)^2 + y^2}| = 2a$$

$$\sqrt{(x-k)^2 + y^2} - \sqrt{(x+k)^2 + y^2} = \pm 2a$$

$$\sqrt{(x-k)^2 + y^2} = \sqrt{(x+k)^2 + y^2} \pm 2a$$

$$(x-k)^2 + y^2 = (x+k)^2 + y^2 \pm 4a\sqrt{(x+k)^2 + y^2} + 4a^2$$

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$$\left| \sqrt{(x-k)^2 + y^2} - \sqrt{(x+k)^2 + y^2} \right| = 2a$$

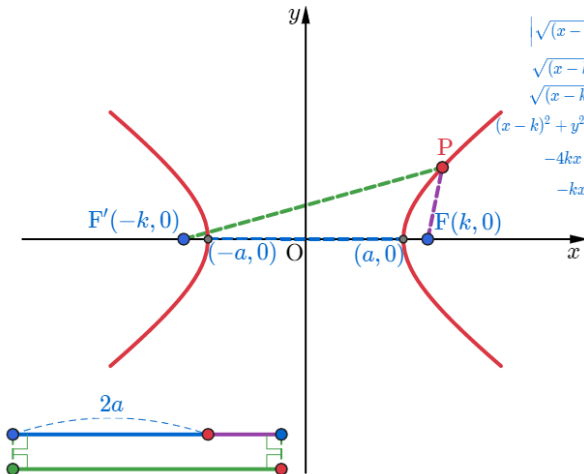
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$$-4kx - 4a^2 = \pm 4a\sqrt{(x+k)^2 + y^2}$$

The hyperbolic equation when the two focal points are $(k, 0)$, $(-k, 0)$ and the difference in length is given by $2a$



$$|\sqrt{(x-k)^2 + y^2} - \sqrt{(x+k)^2 + y^2}| = 2a$$

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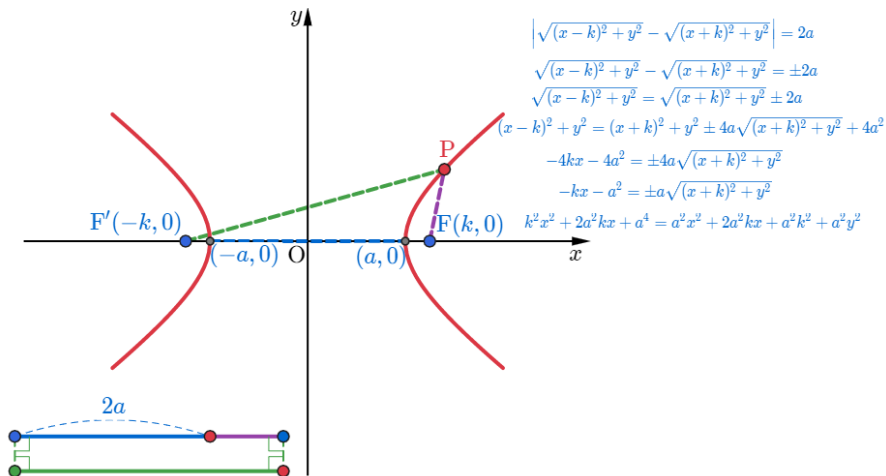
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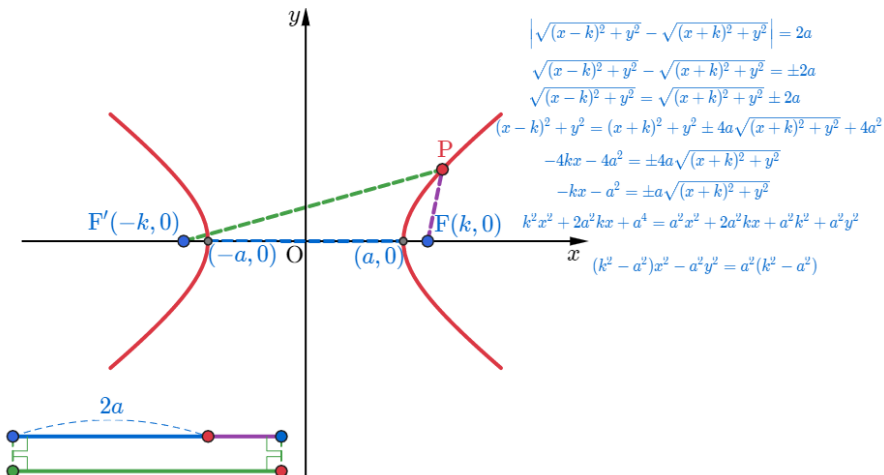
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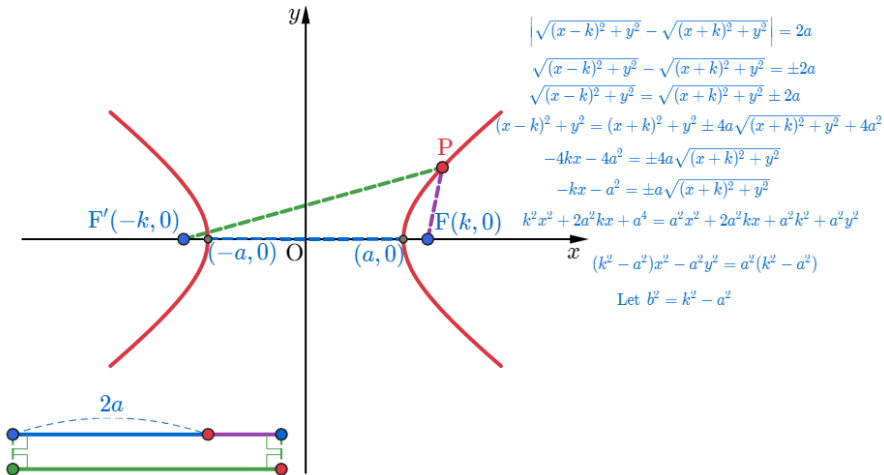
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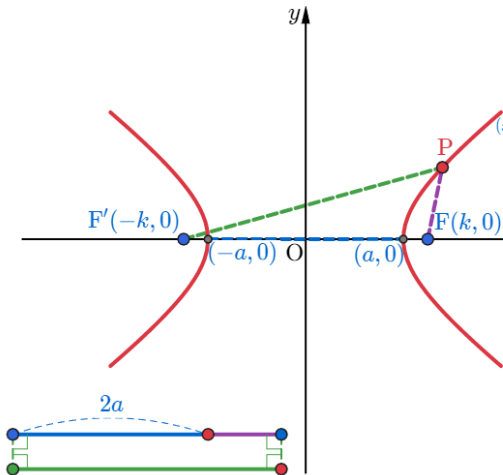
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$$\left| \sqrt{(x-k)^2 + y^2} - \sqrt{(x+k)^2 + y^2} \right| = 2a$$

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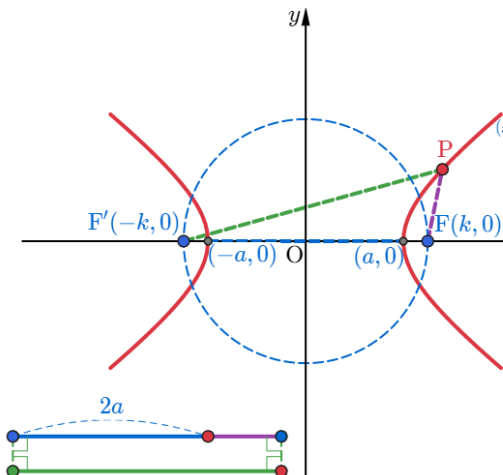
$$k^2x^2 + 2a^2kx + a^4 = a^2x^2 + 2a^2kx + a^2k^2 + a^2y^2$$

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

Let $b^2 = k^2 - a^2$

$$\therefore \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

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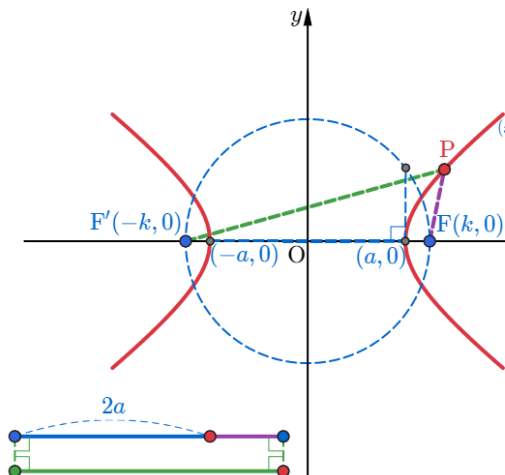
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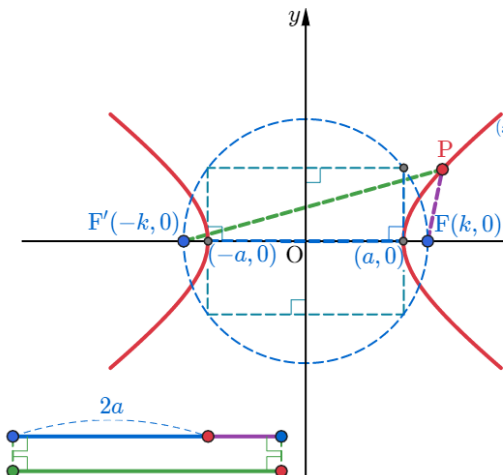
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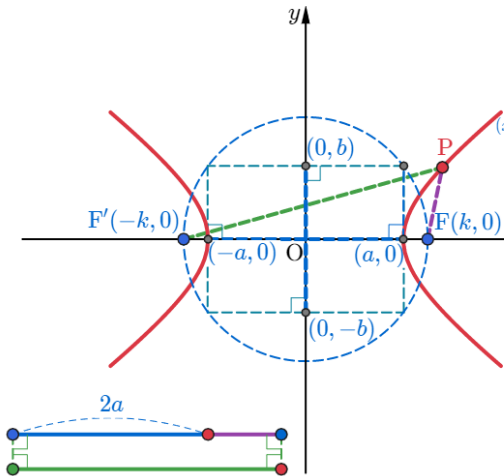
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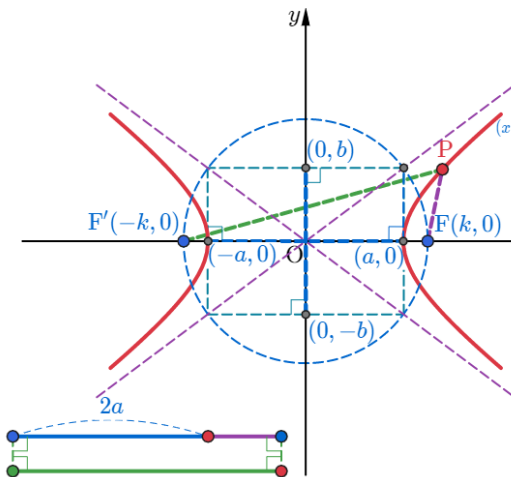
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Github:

<https://min7014.github.io/math20200605001.html>

Click or paste URL into the URL search bar, and you can see a picture moving.