



Universidad
de La Laguna

*Un fisquito de
Matemáticas
8ª temporada*

**UN FISQUITO QUE
PROBABLEMENTE
NO ESPERABAS**

**Patricia
Hernández León**



Nombre:

Fisquito de Matemáticas

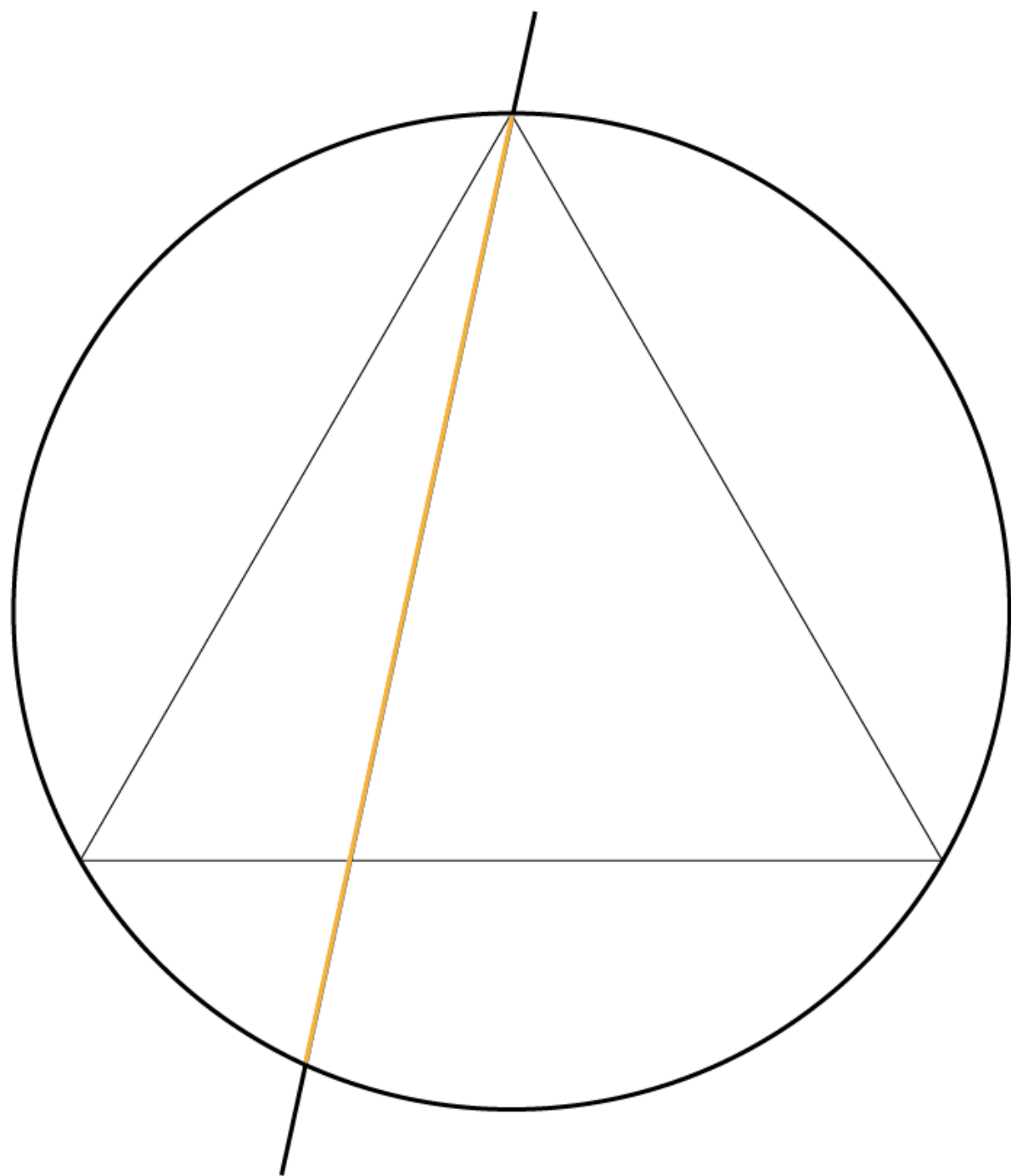
Fecha:

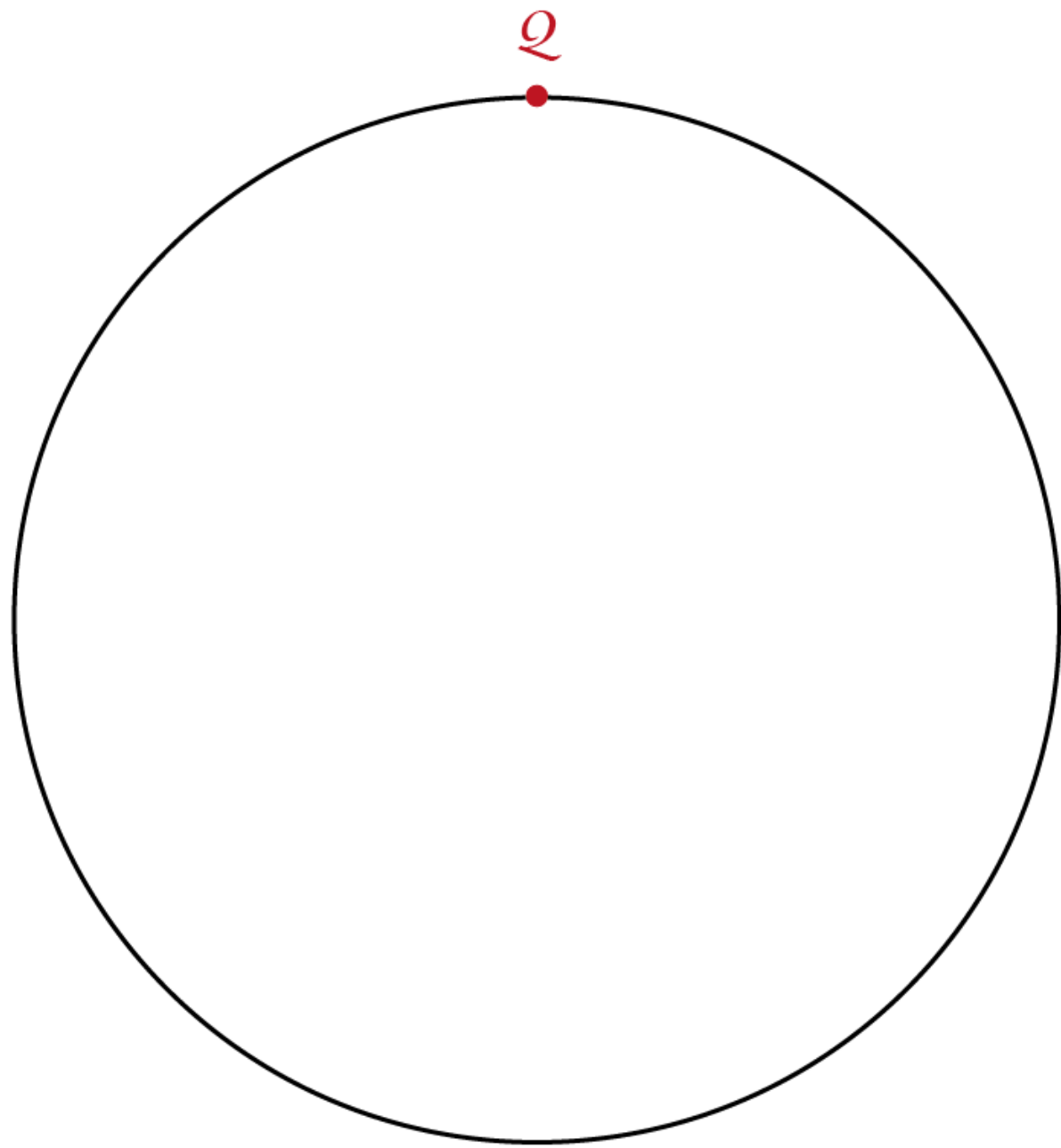
21/03/2019

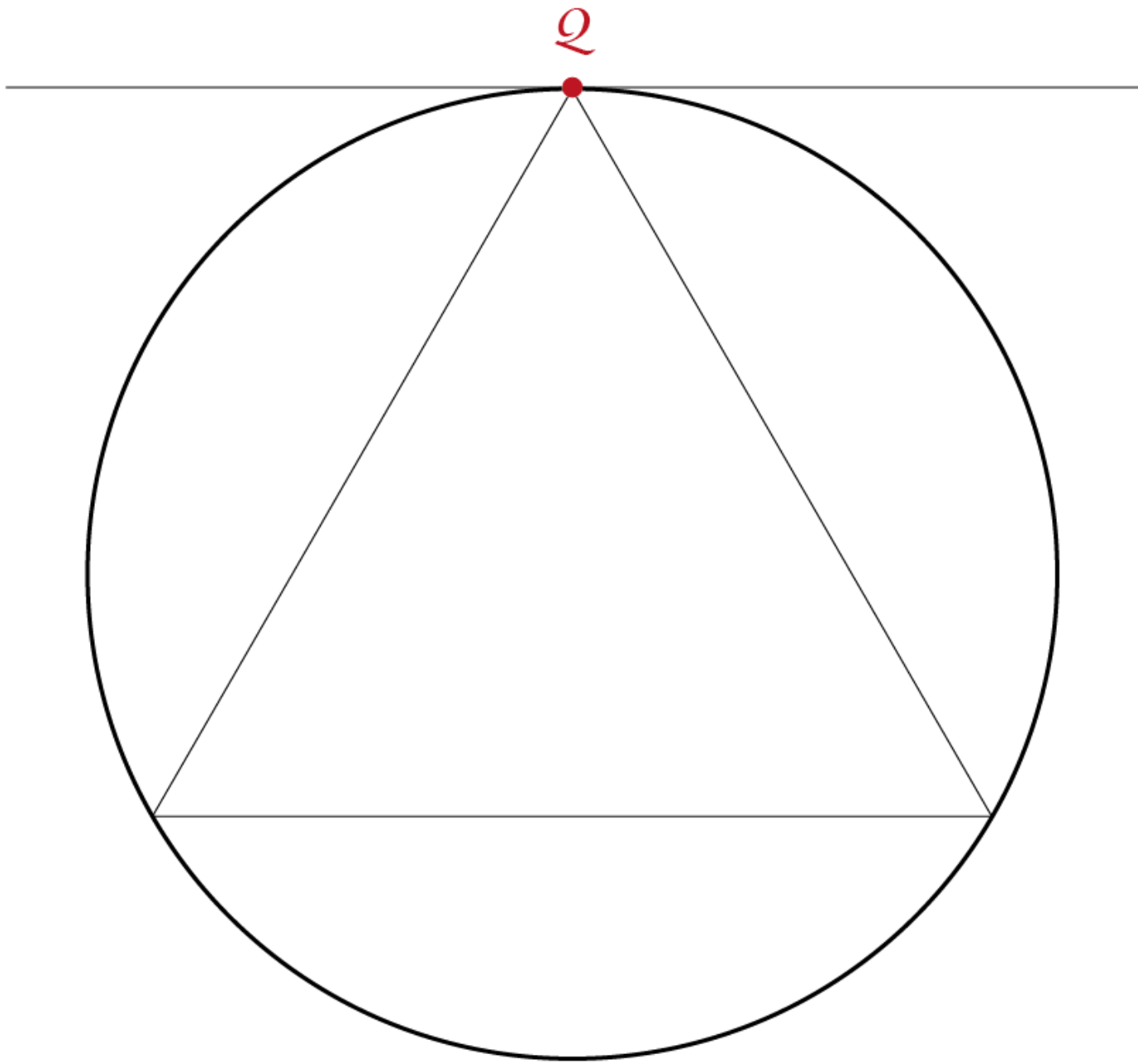
Probabilidad y Estadística

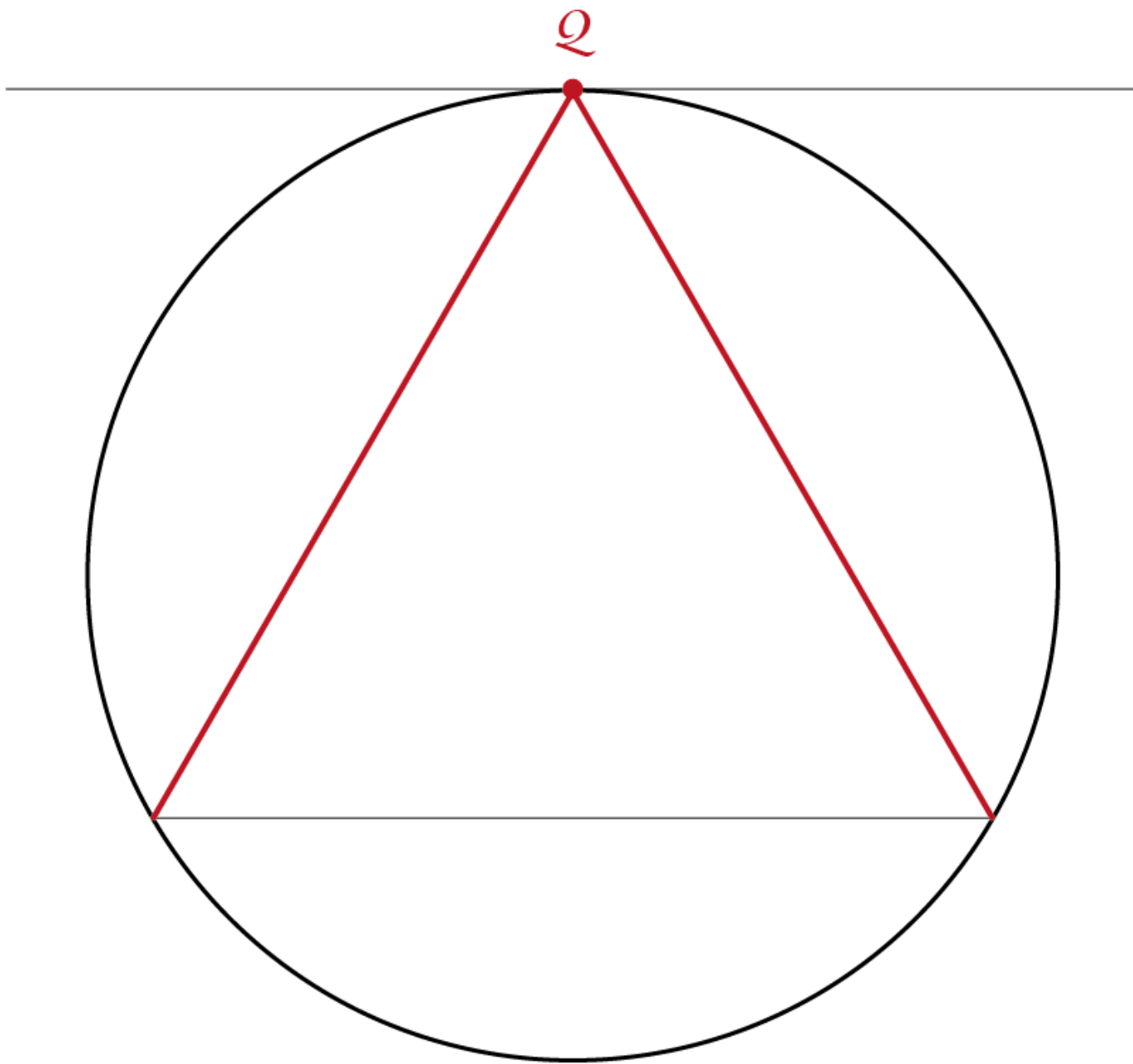
Probabilidad avanzada para fisquiteros

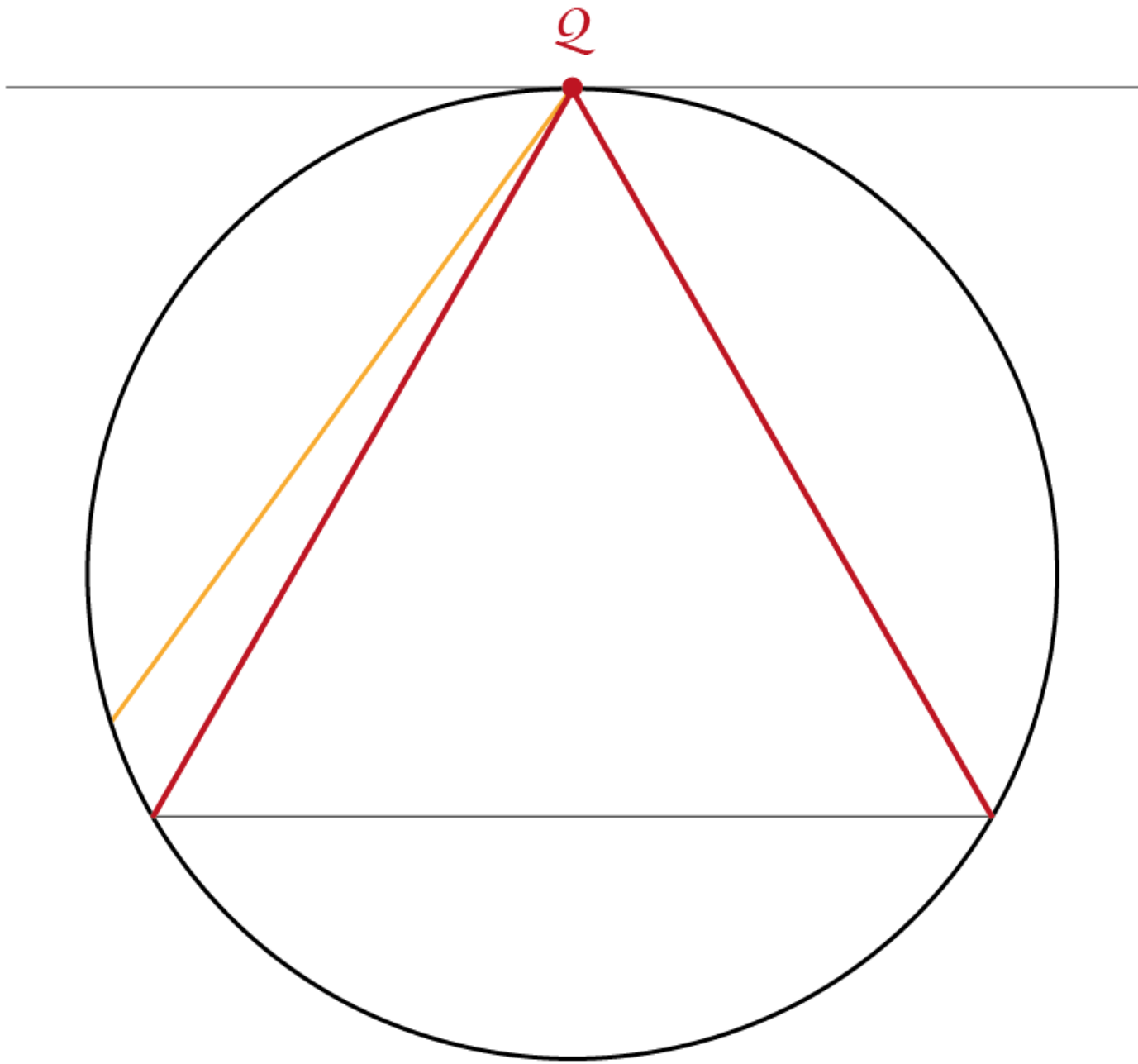
1. Trazamos aleatoriamente una cuerda dentro de un círculo.
¿Cuál es la probabilidad de que su longitud sea mayor que la del lado del triángulo equilátero circunscrito?

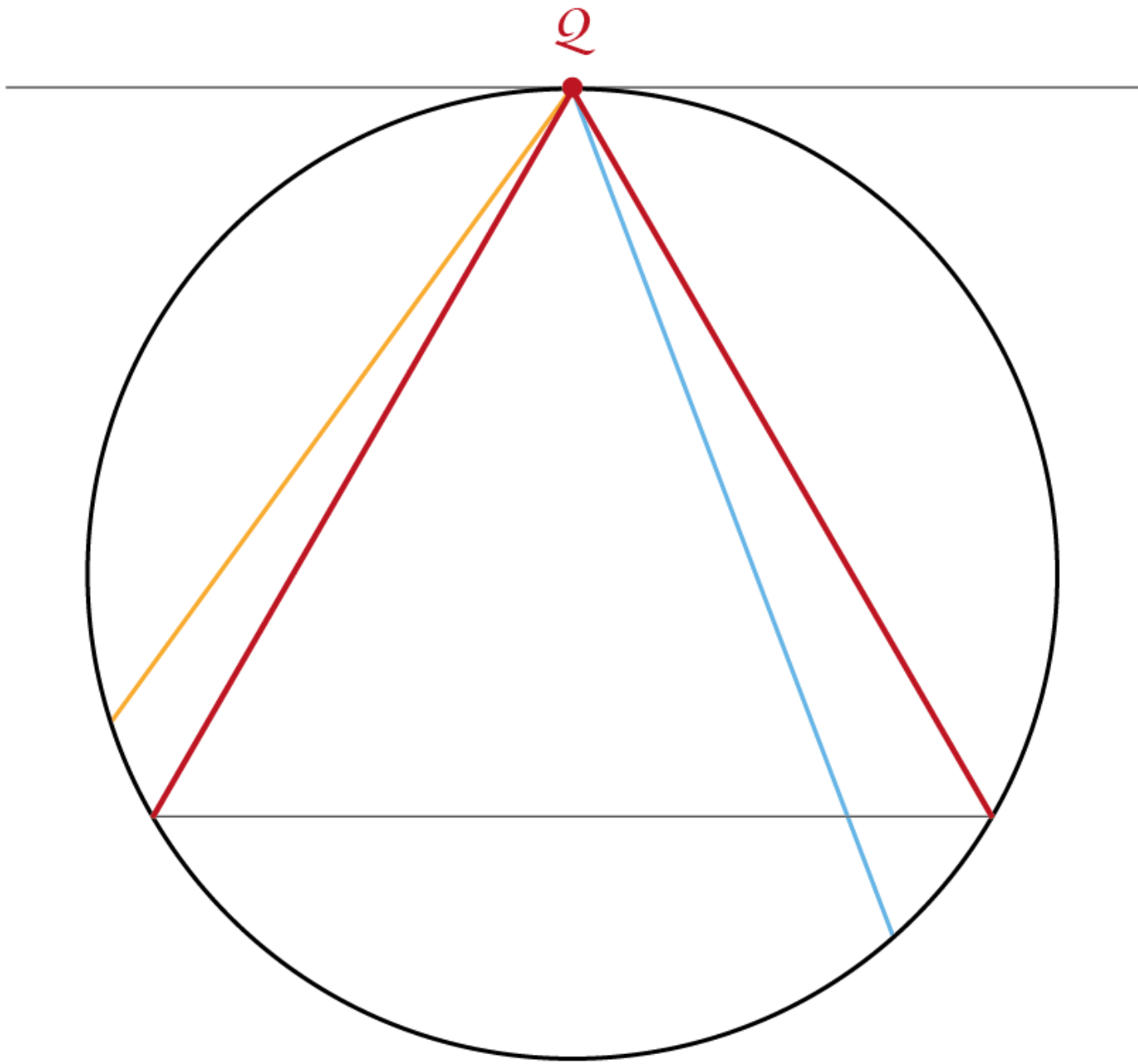


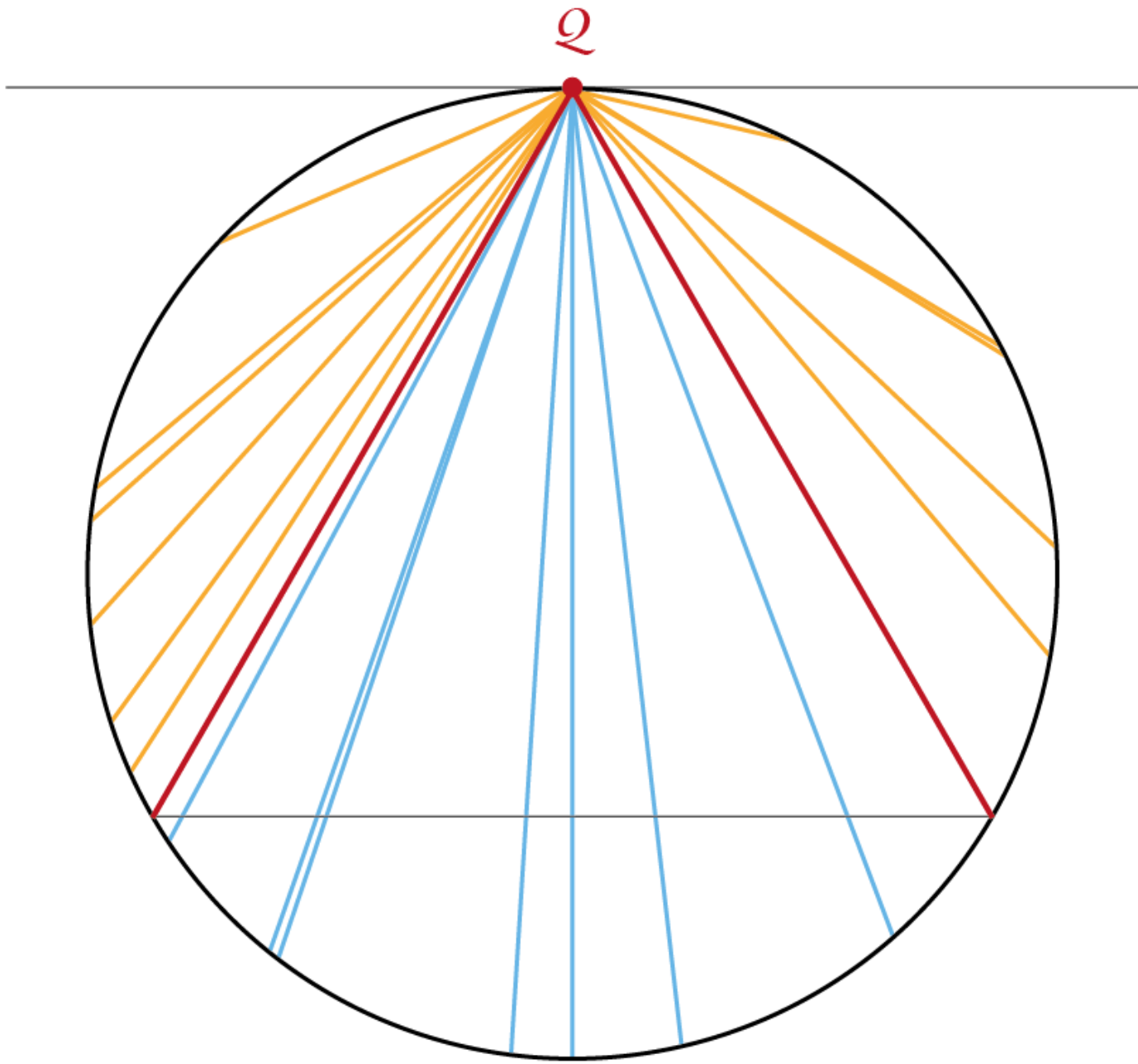


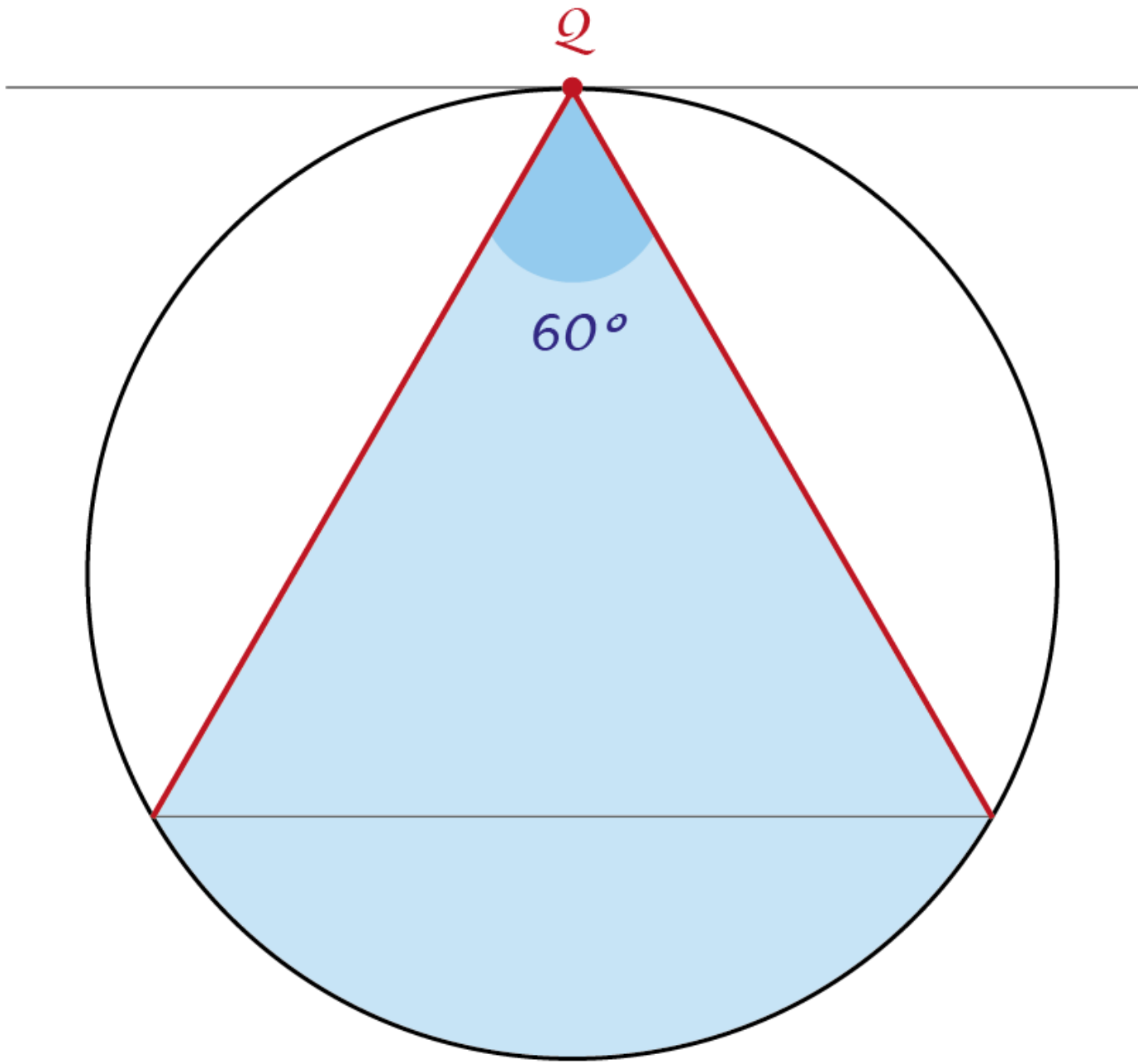


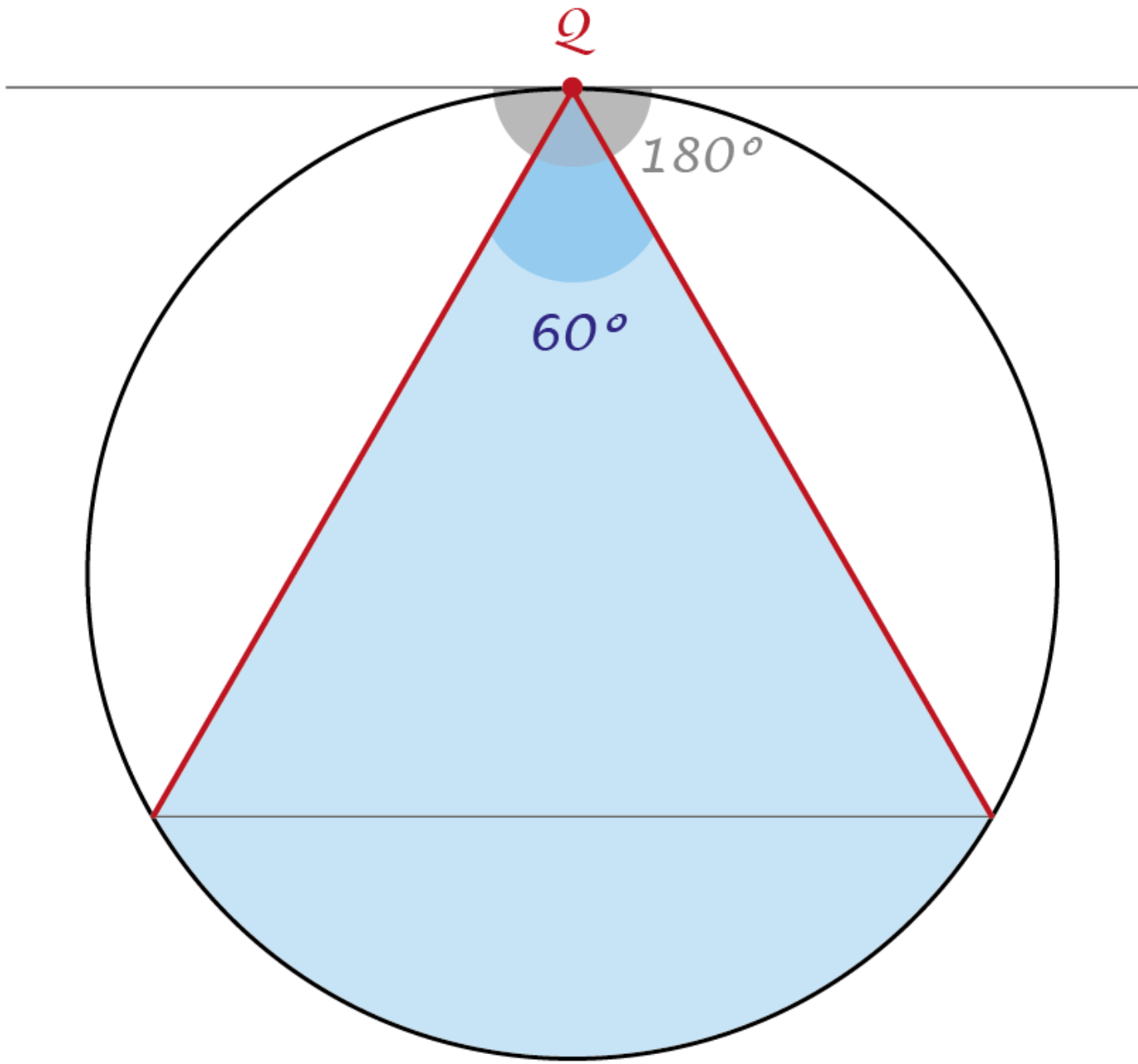


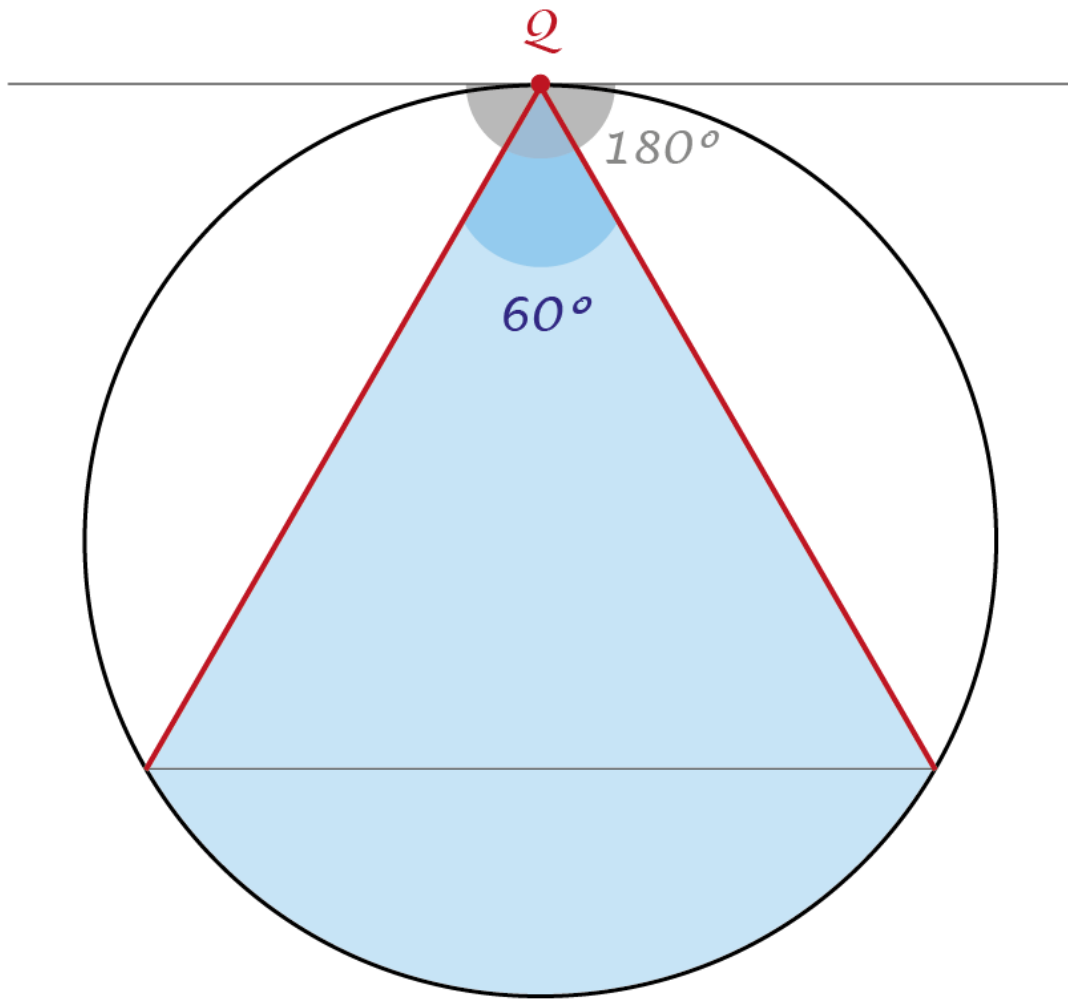




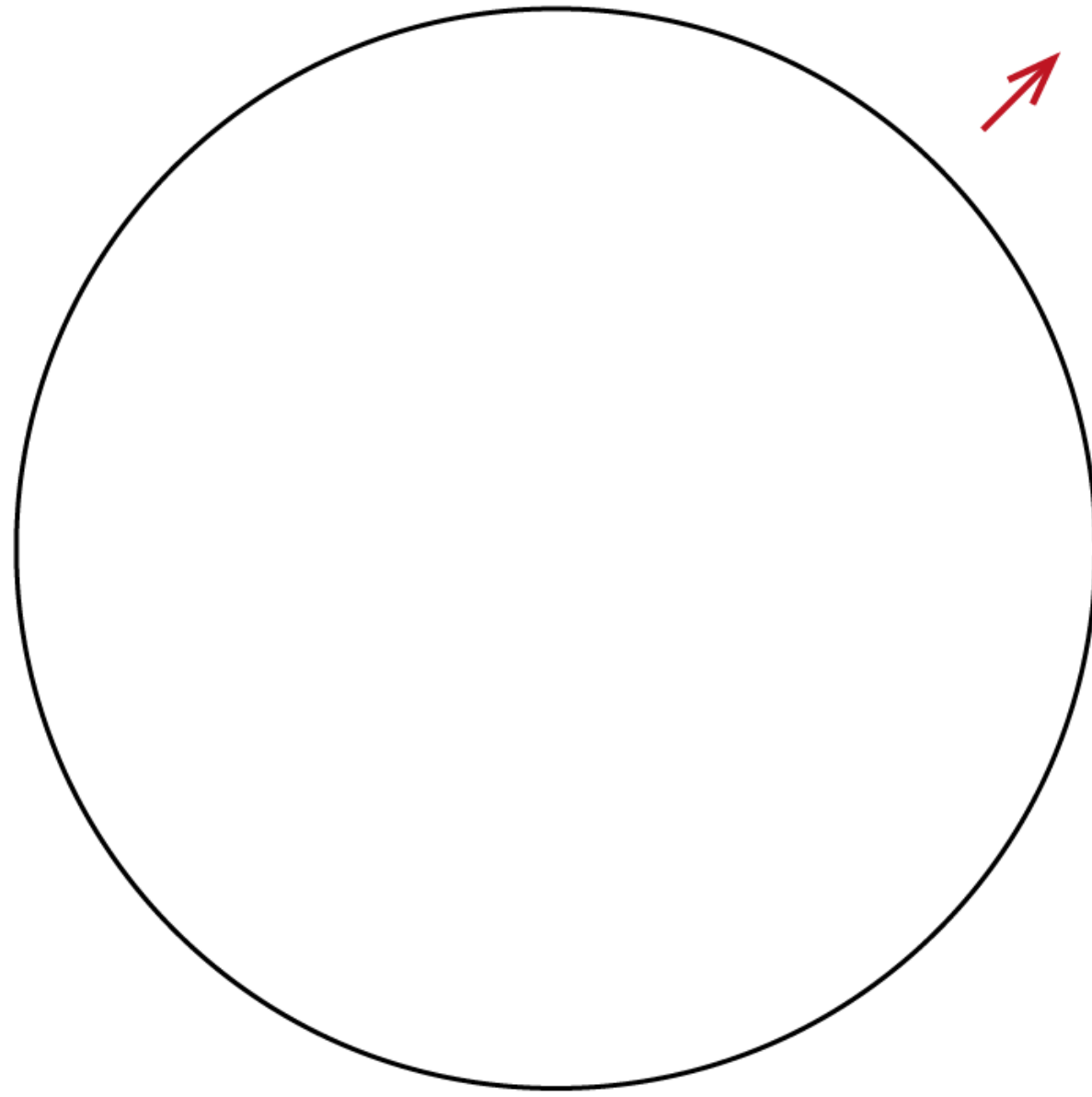


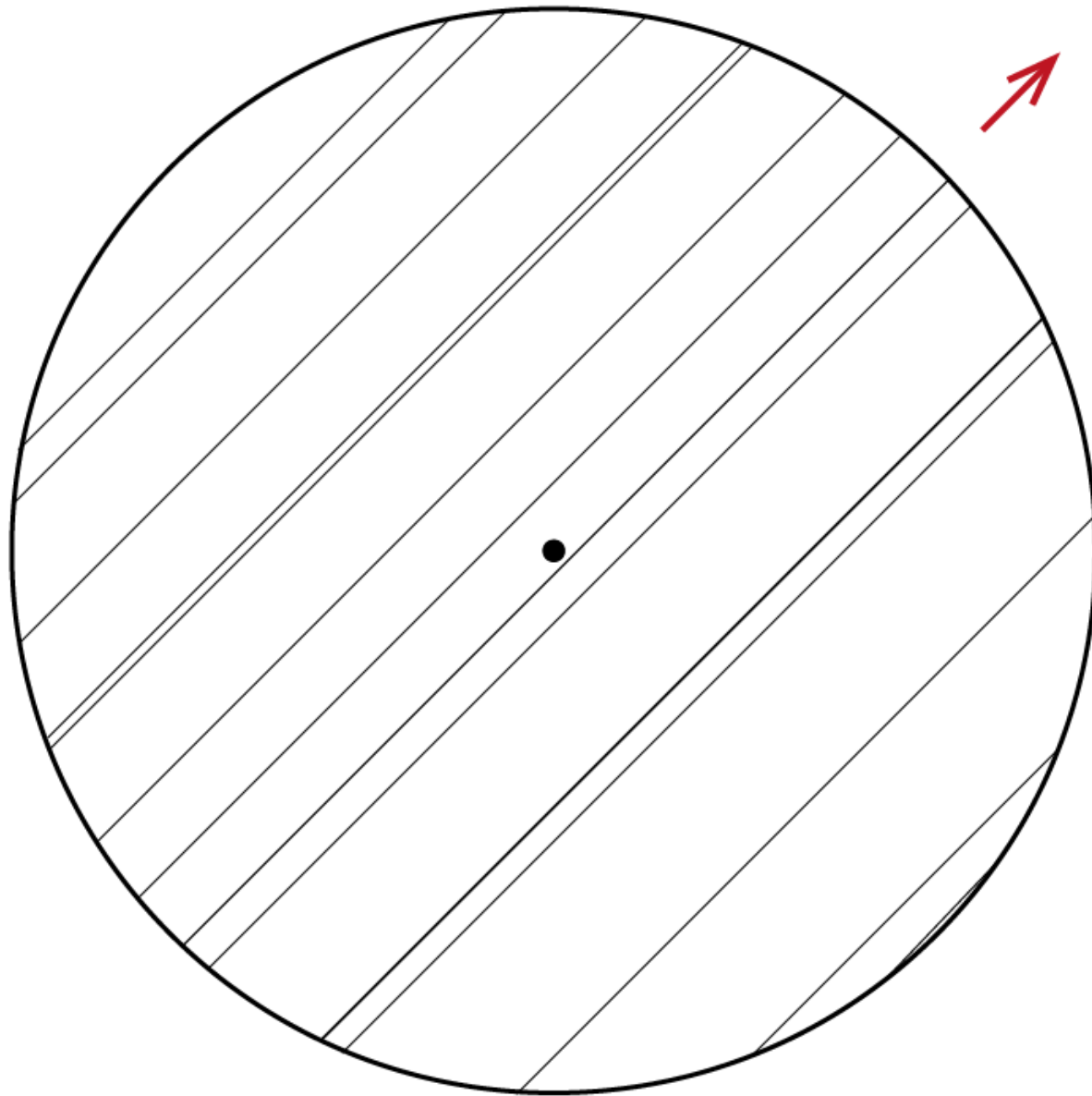


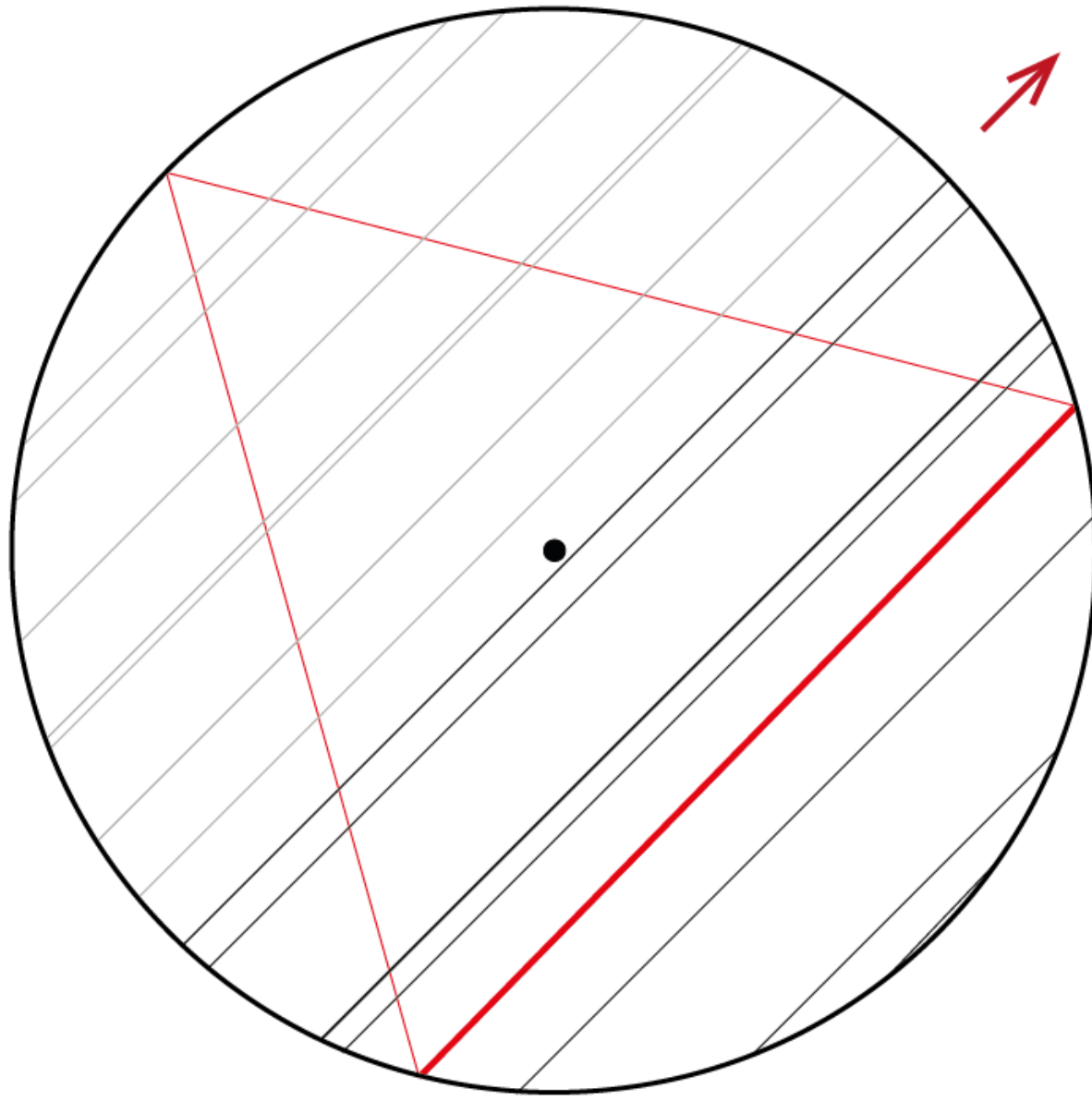


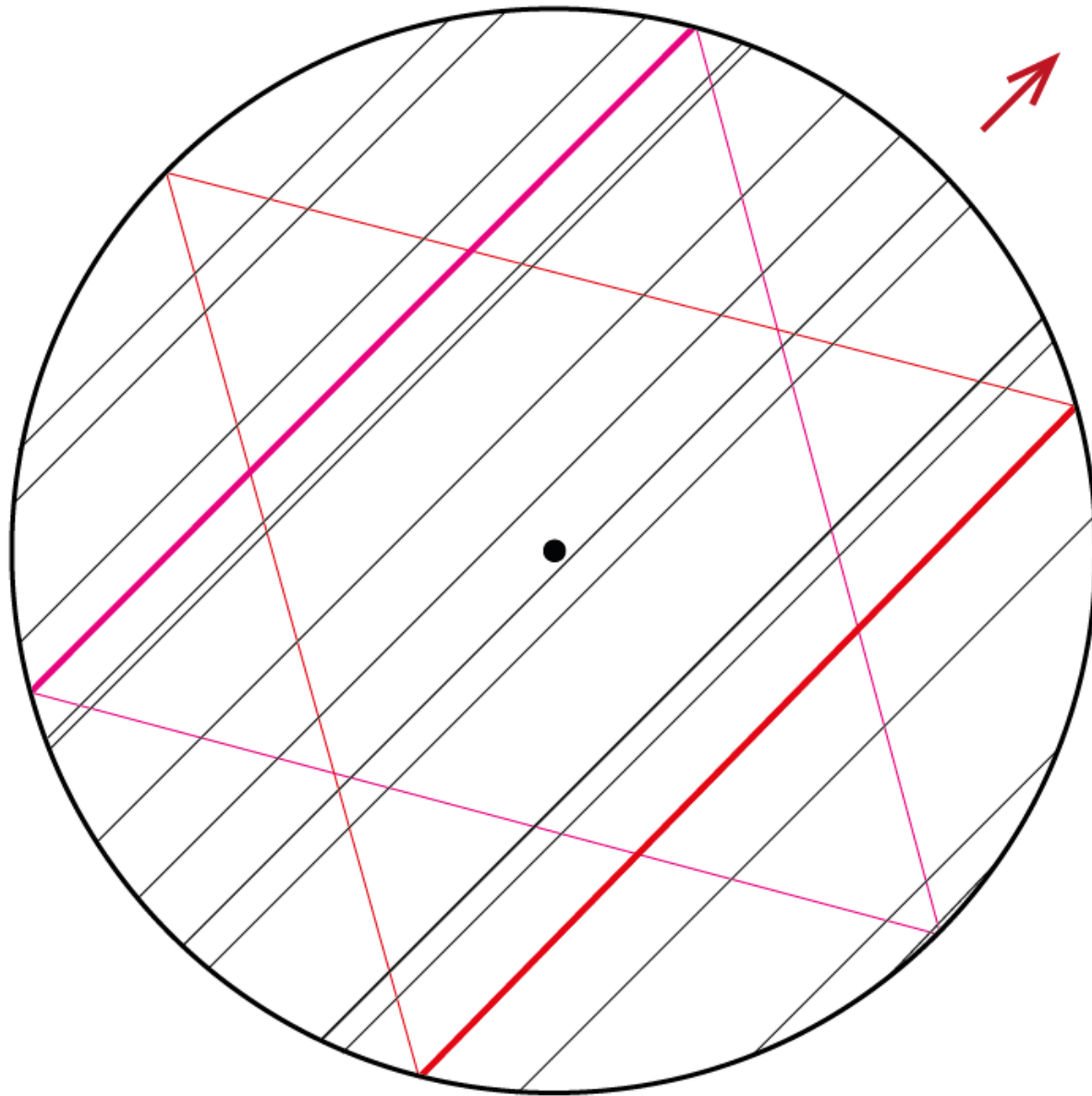


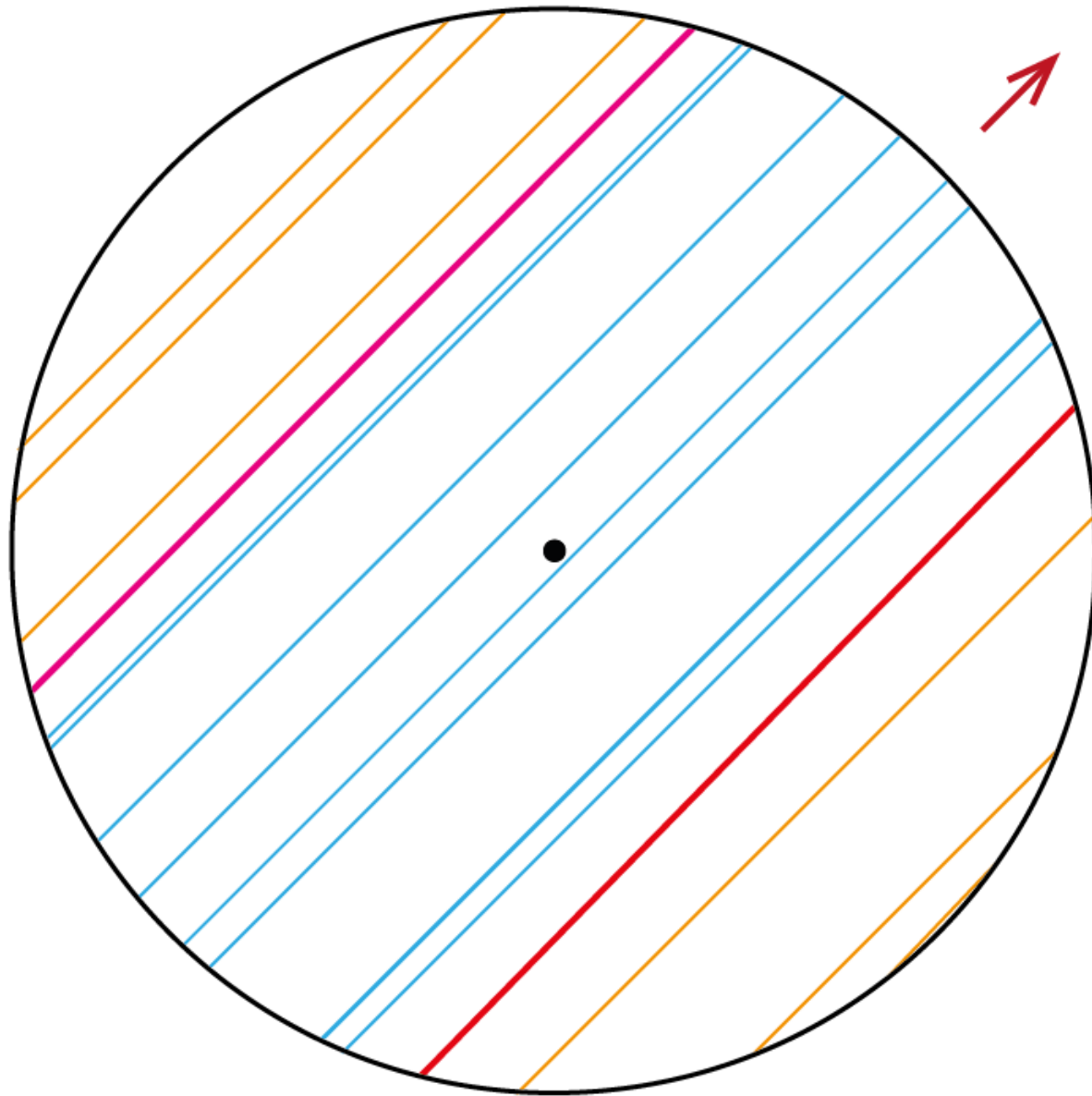
$$P = 60^\circ / 180^\circ = 1/3$$

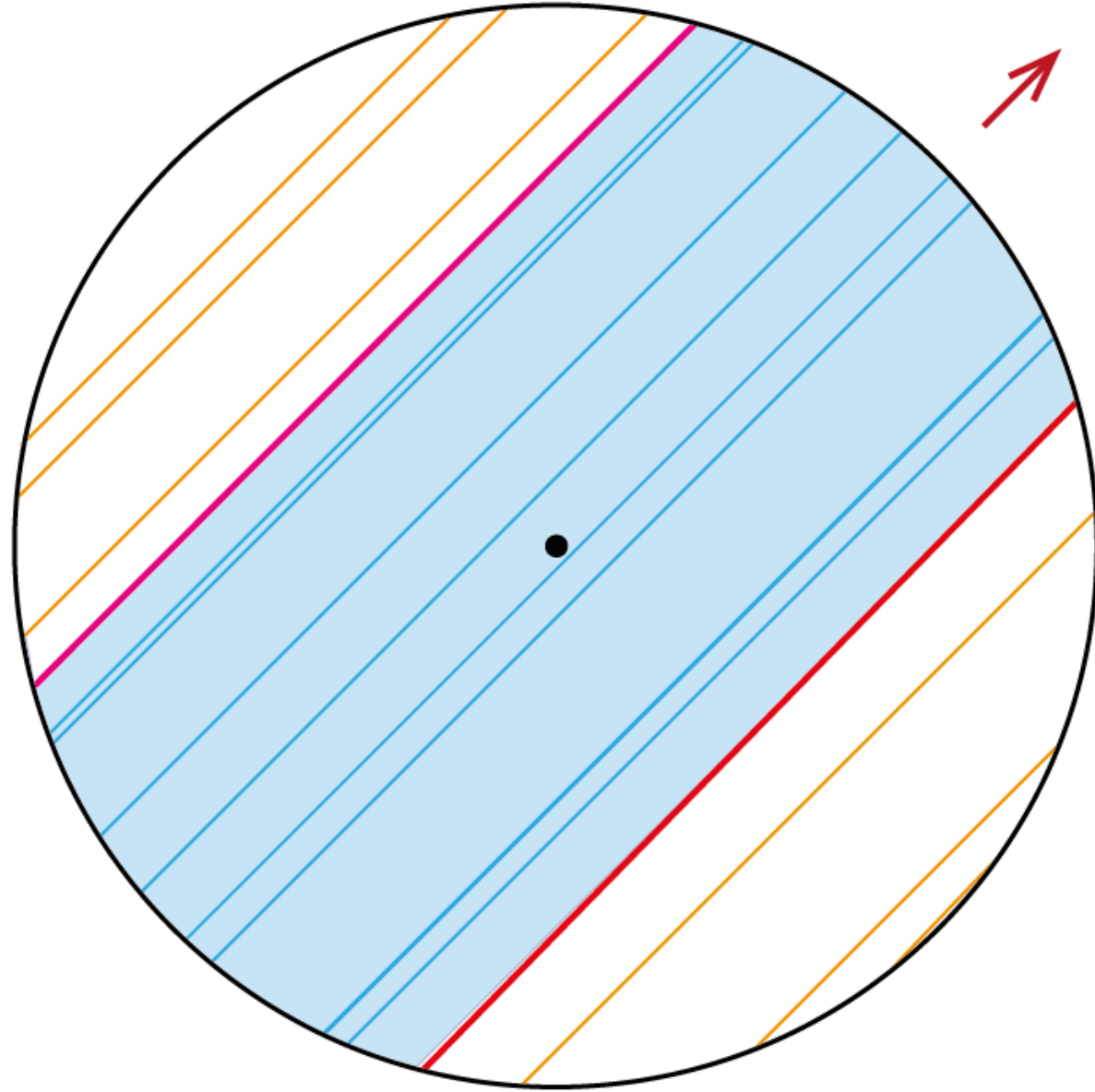


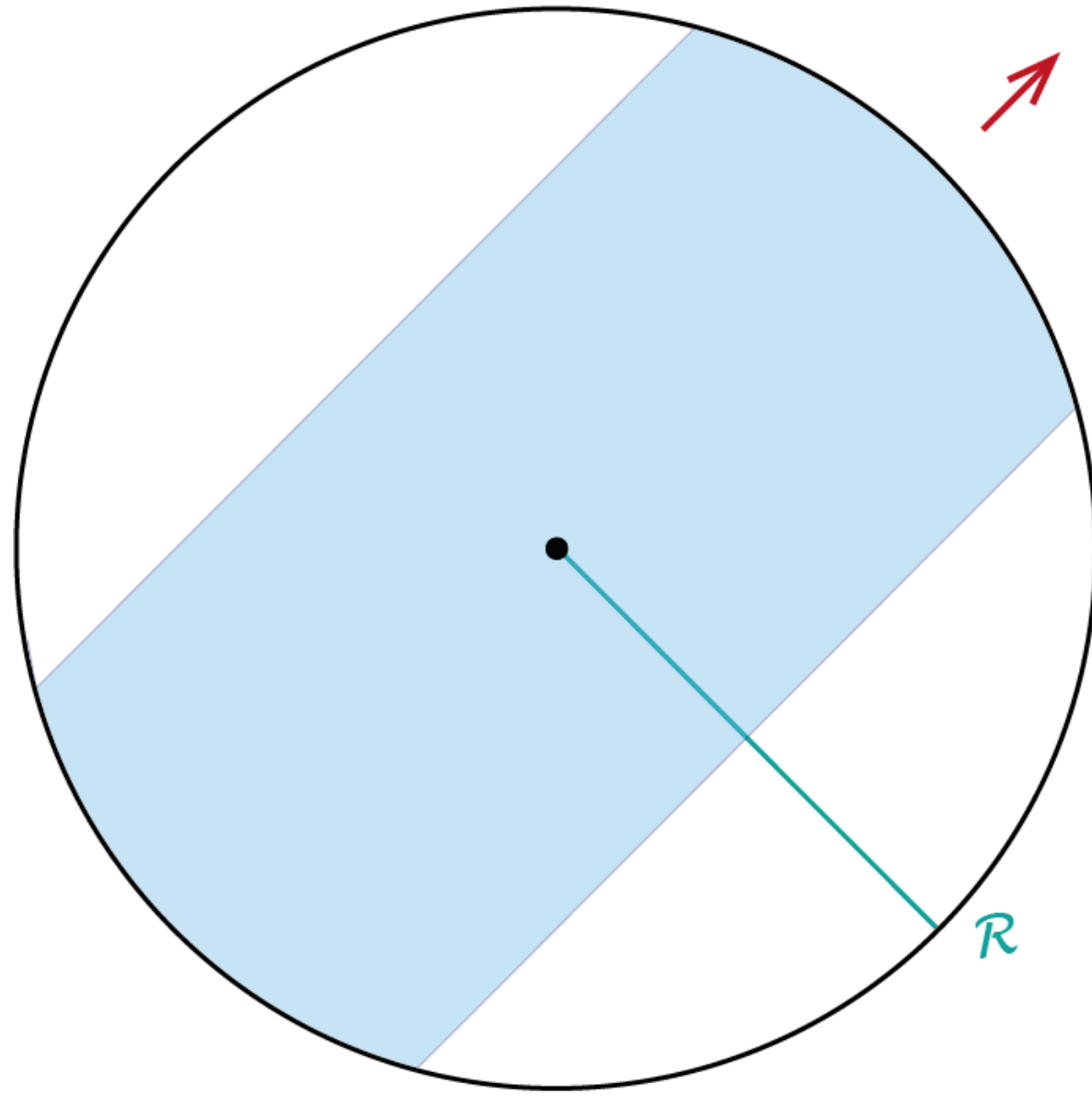


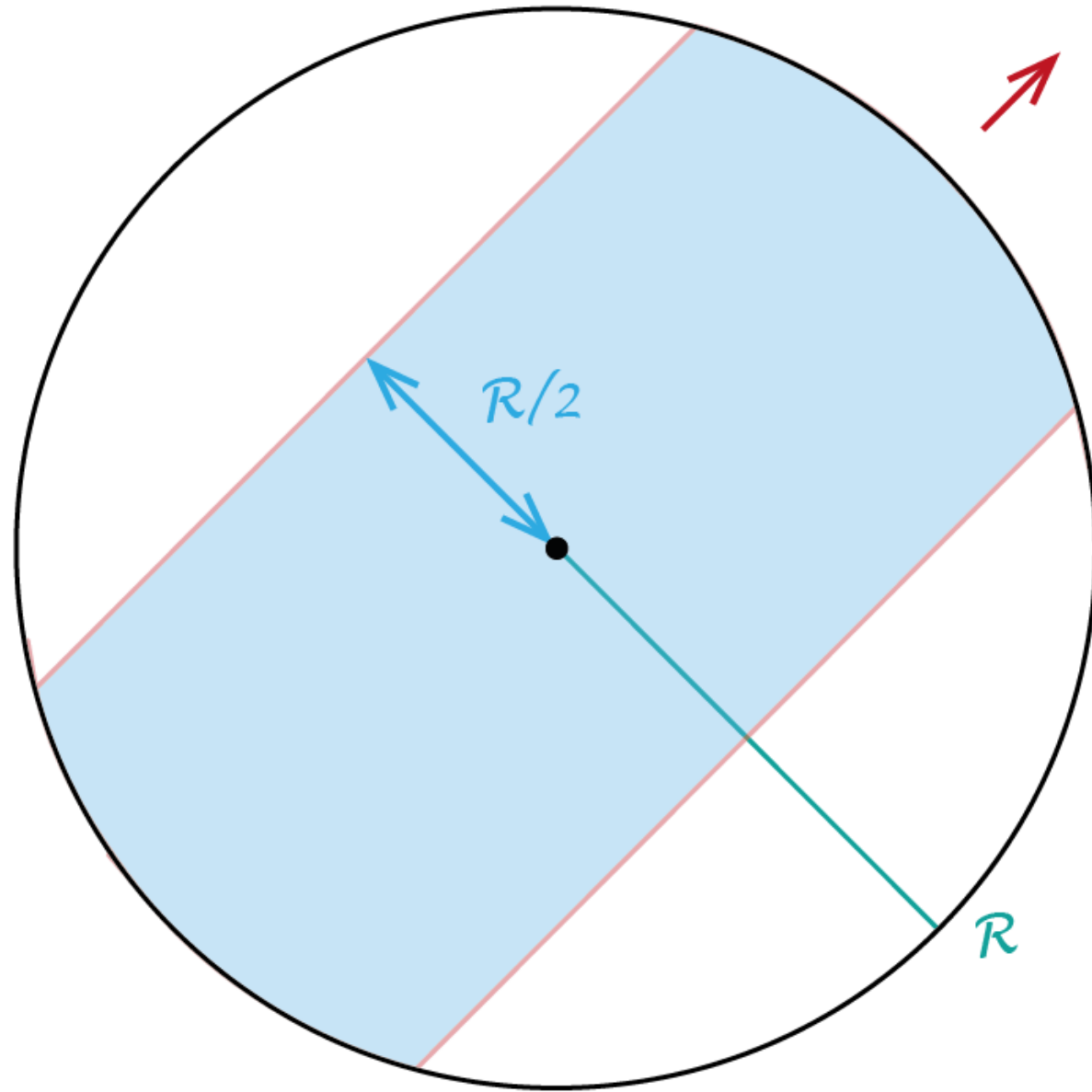


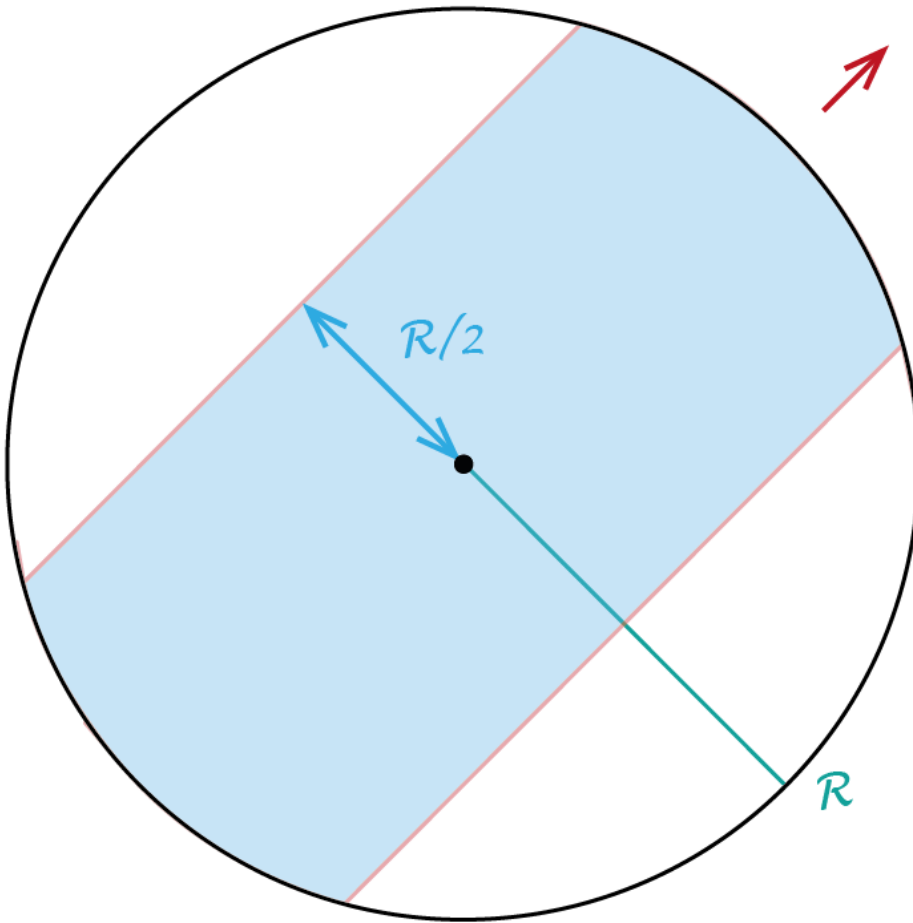










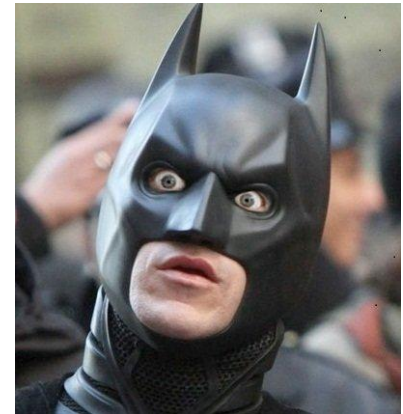
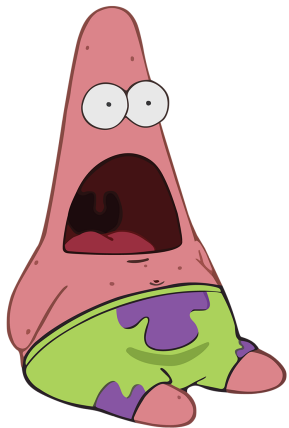
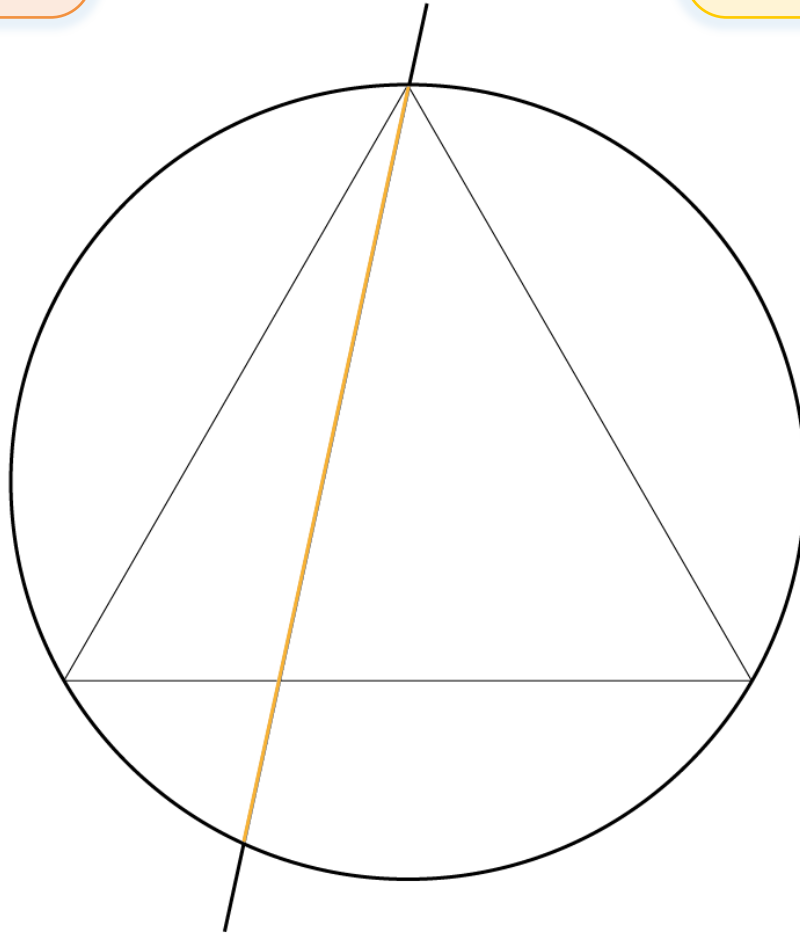


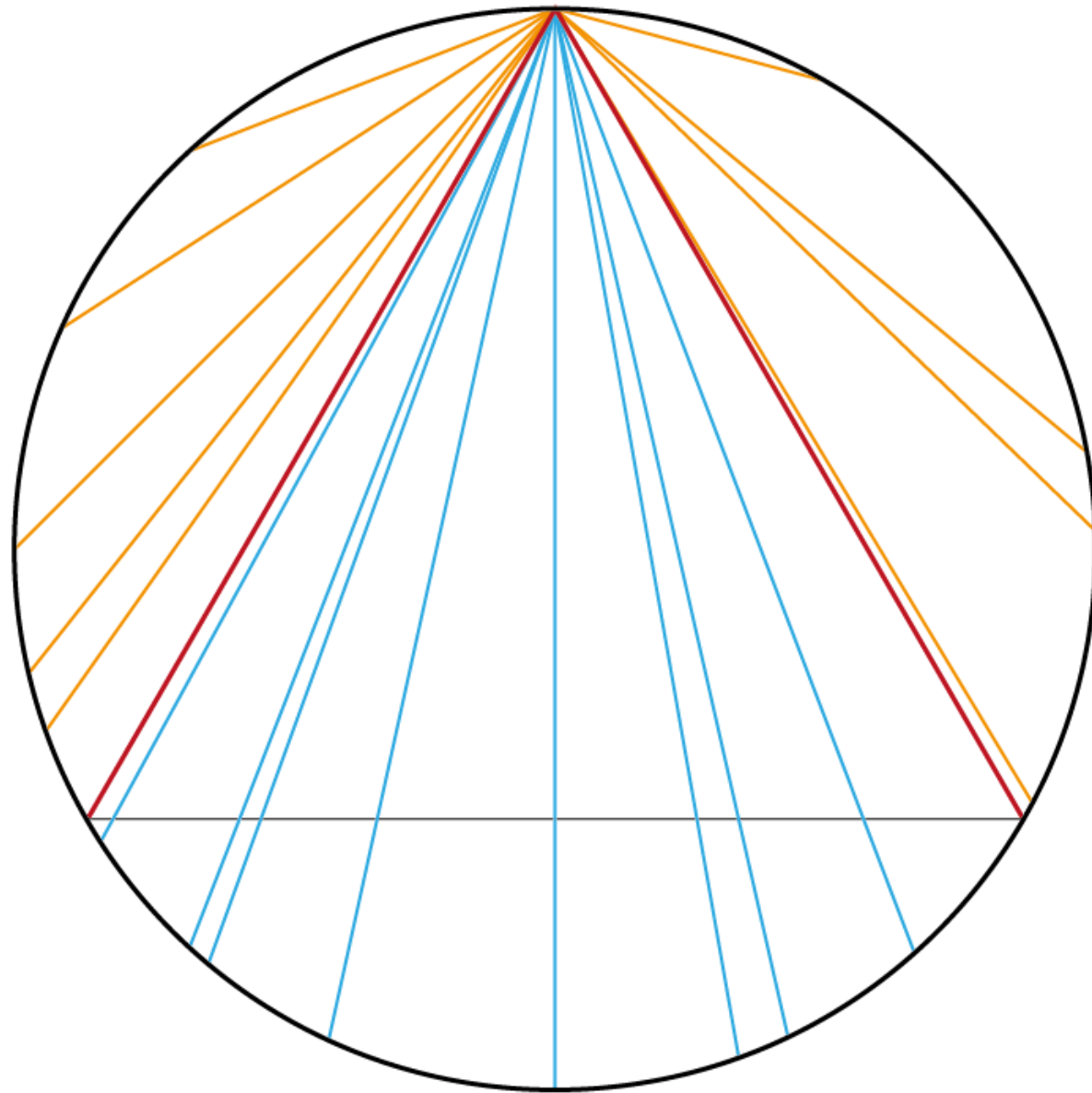
$$P = \frac{2 \cdot R/2}{2R} = 1/2$$

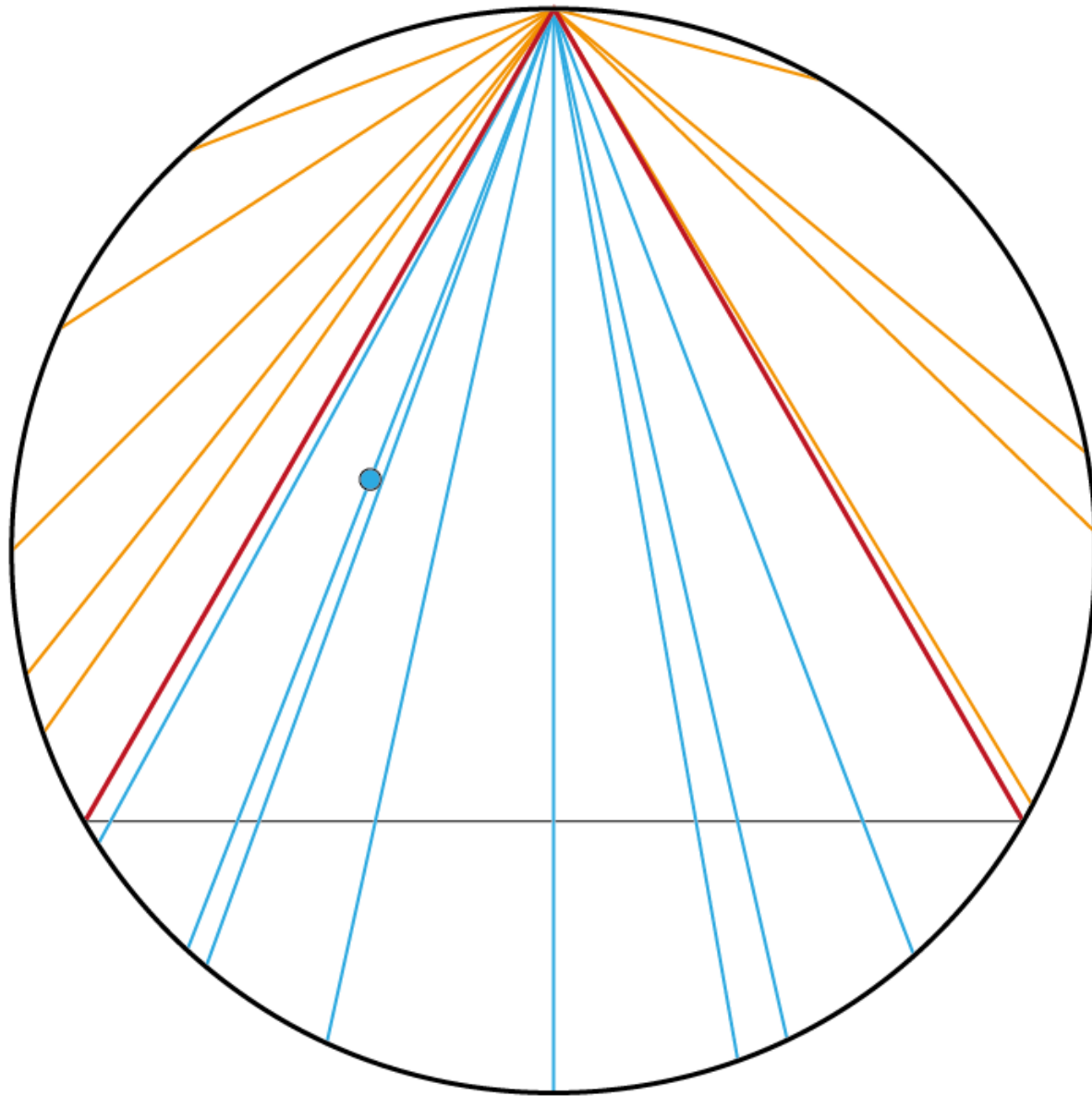
$$P=1/3$$

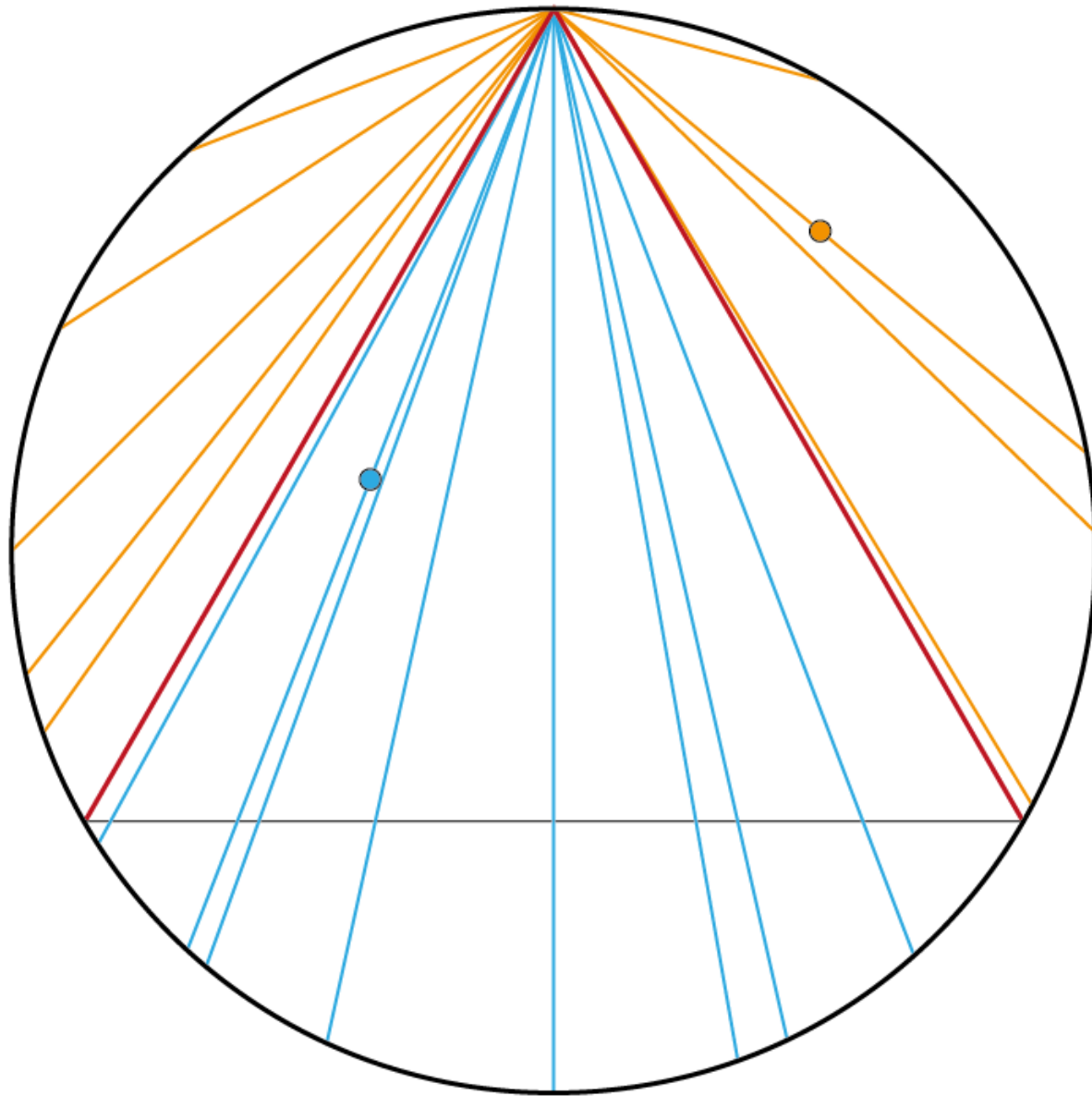
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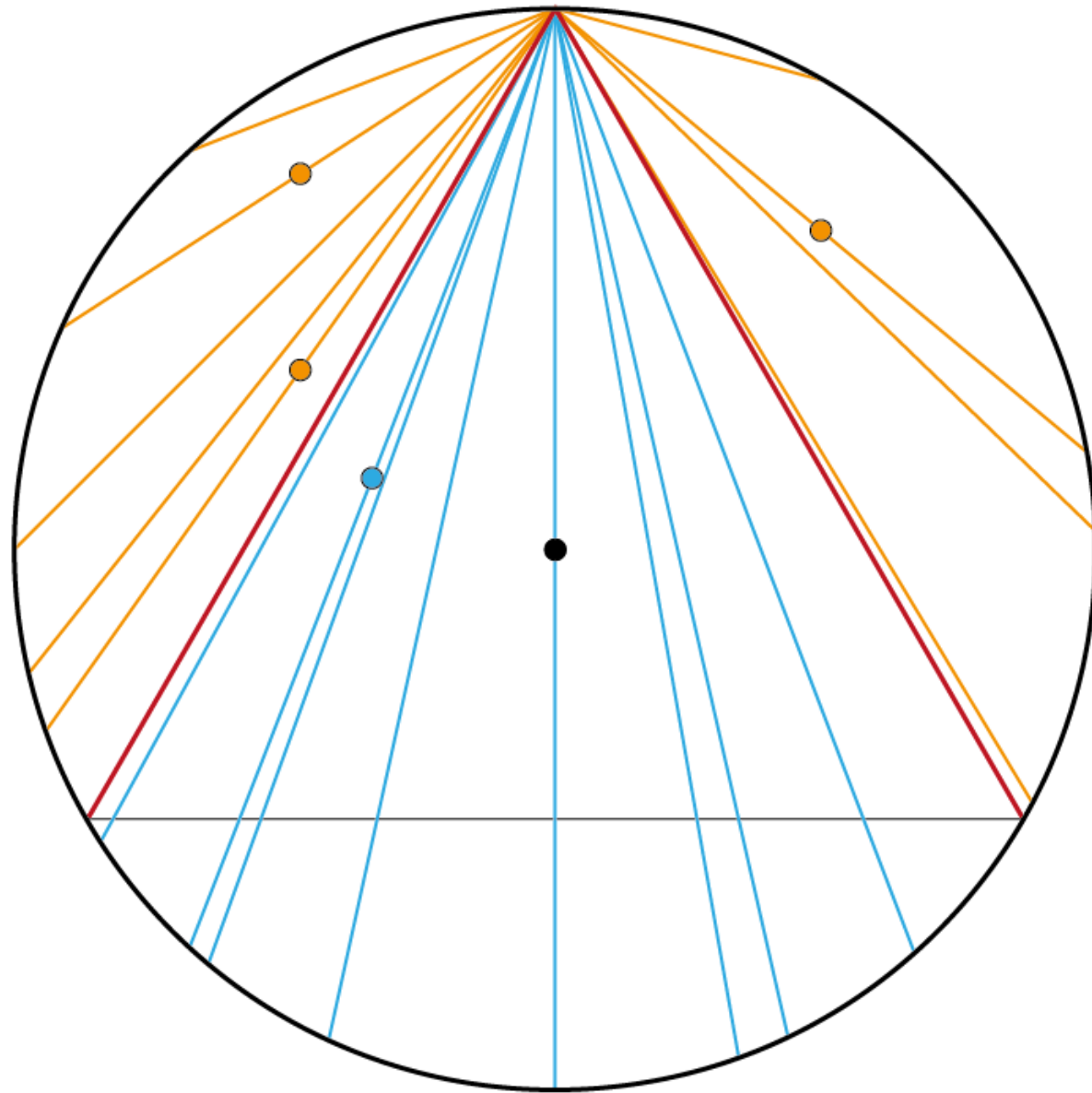
$$P=1/2$$

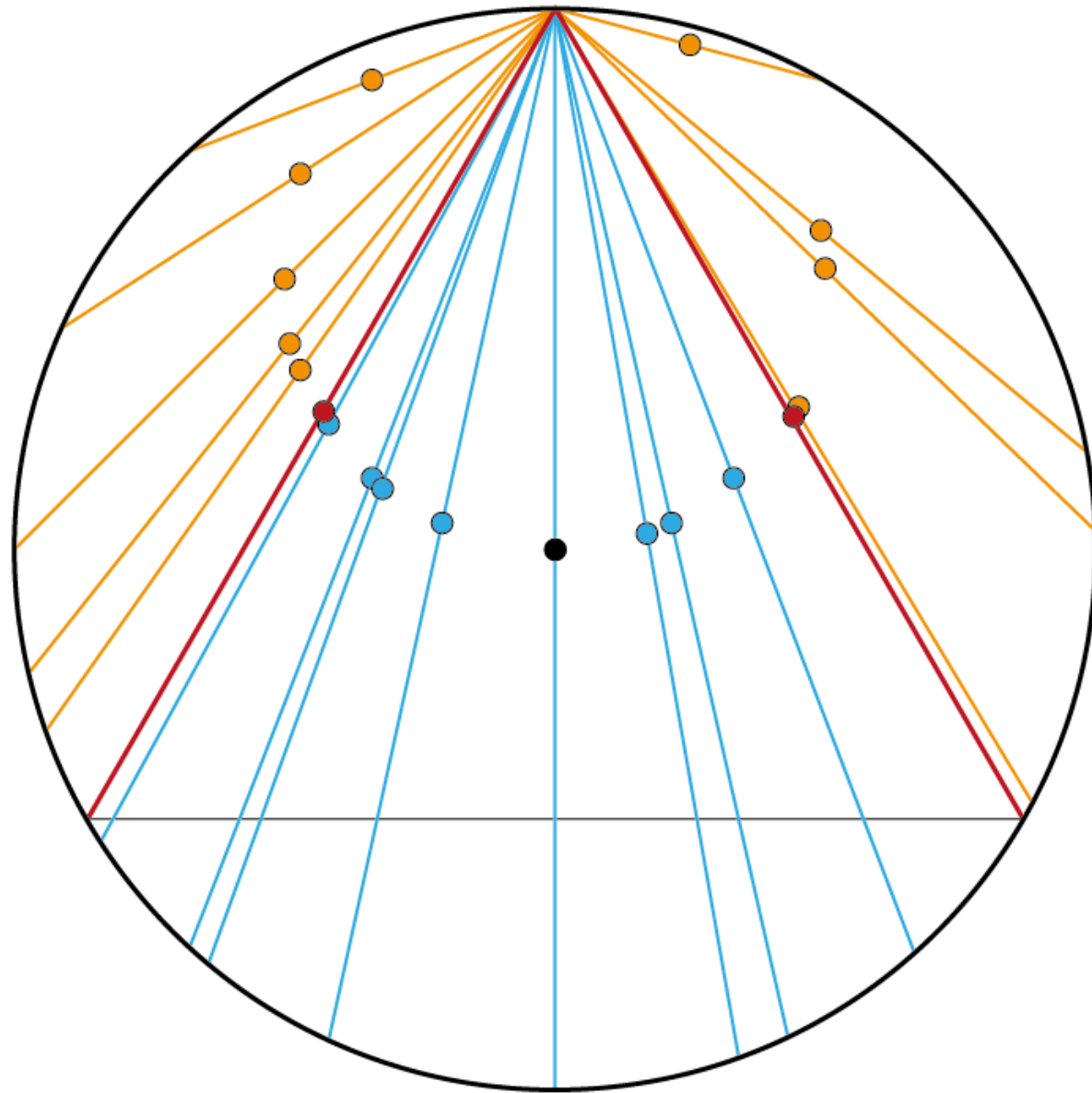


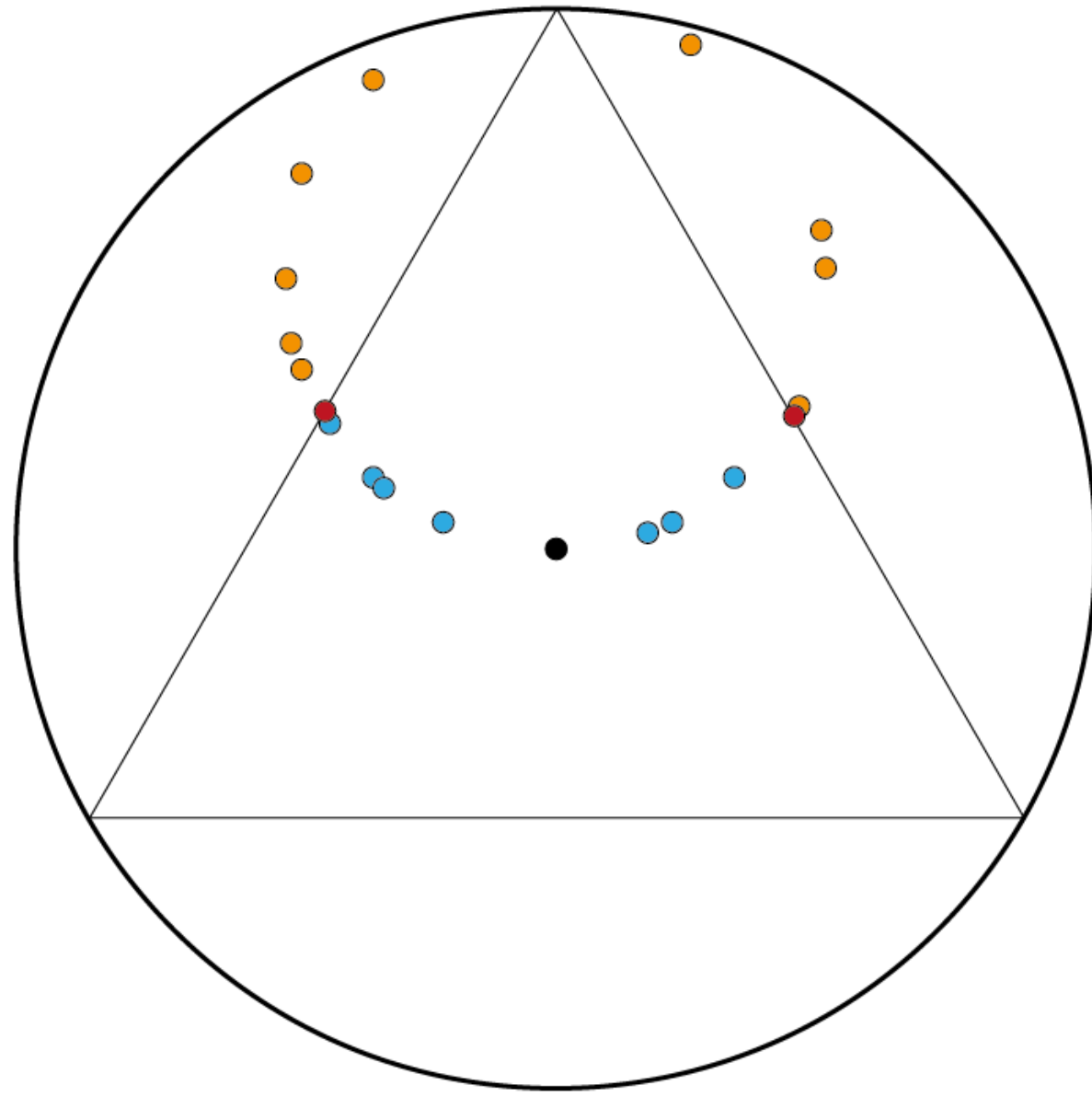


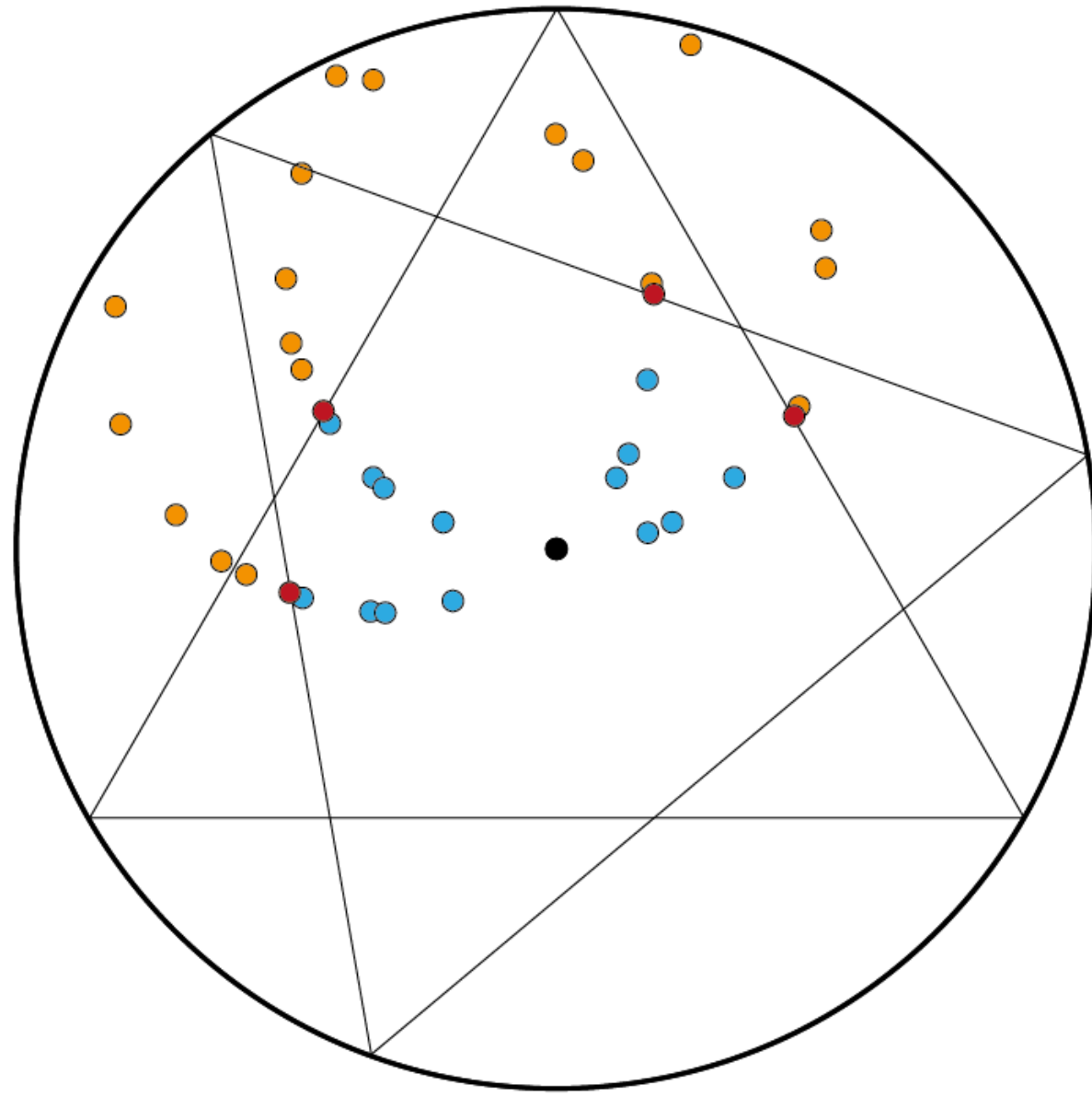


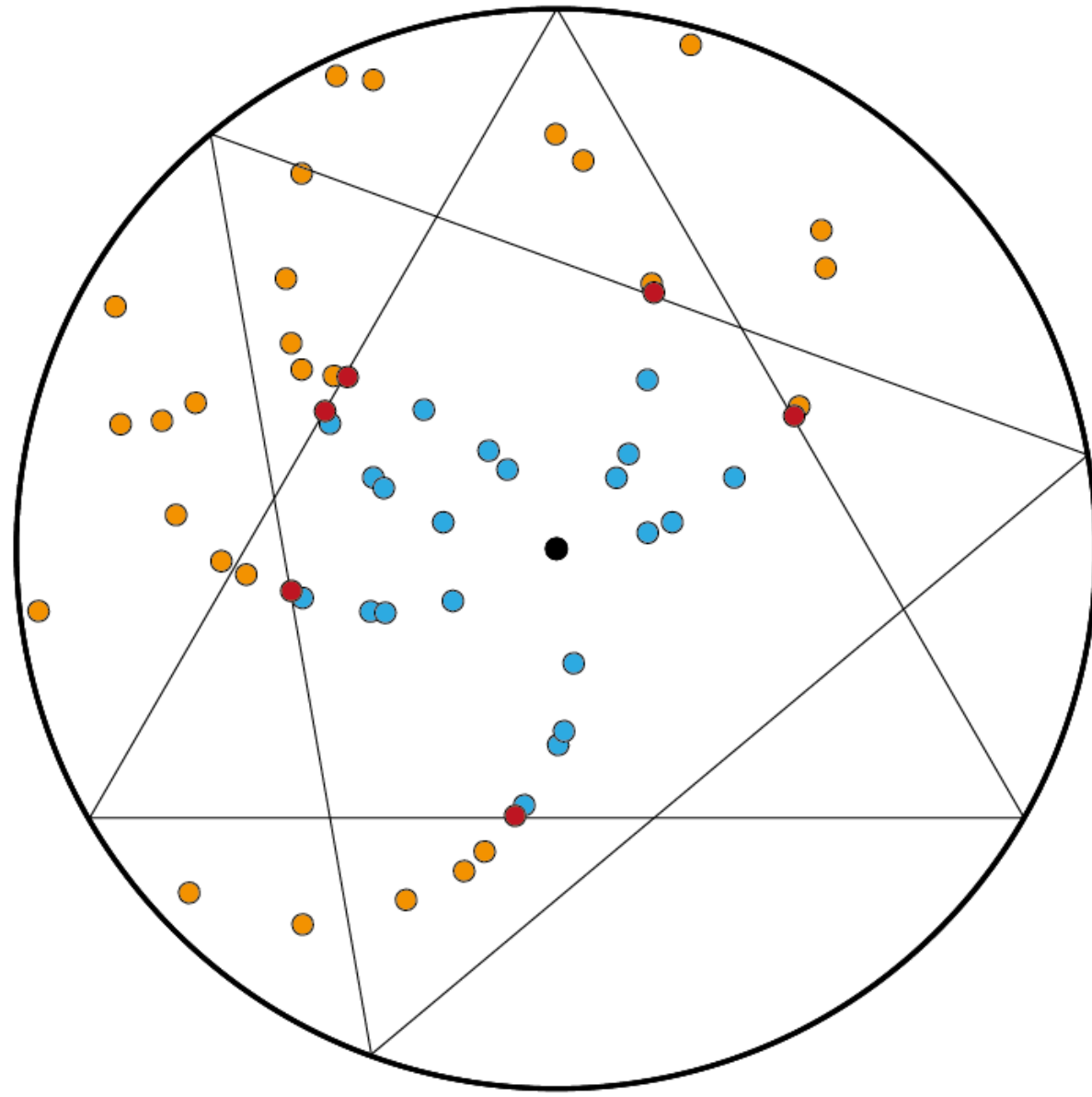


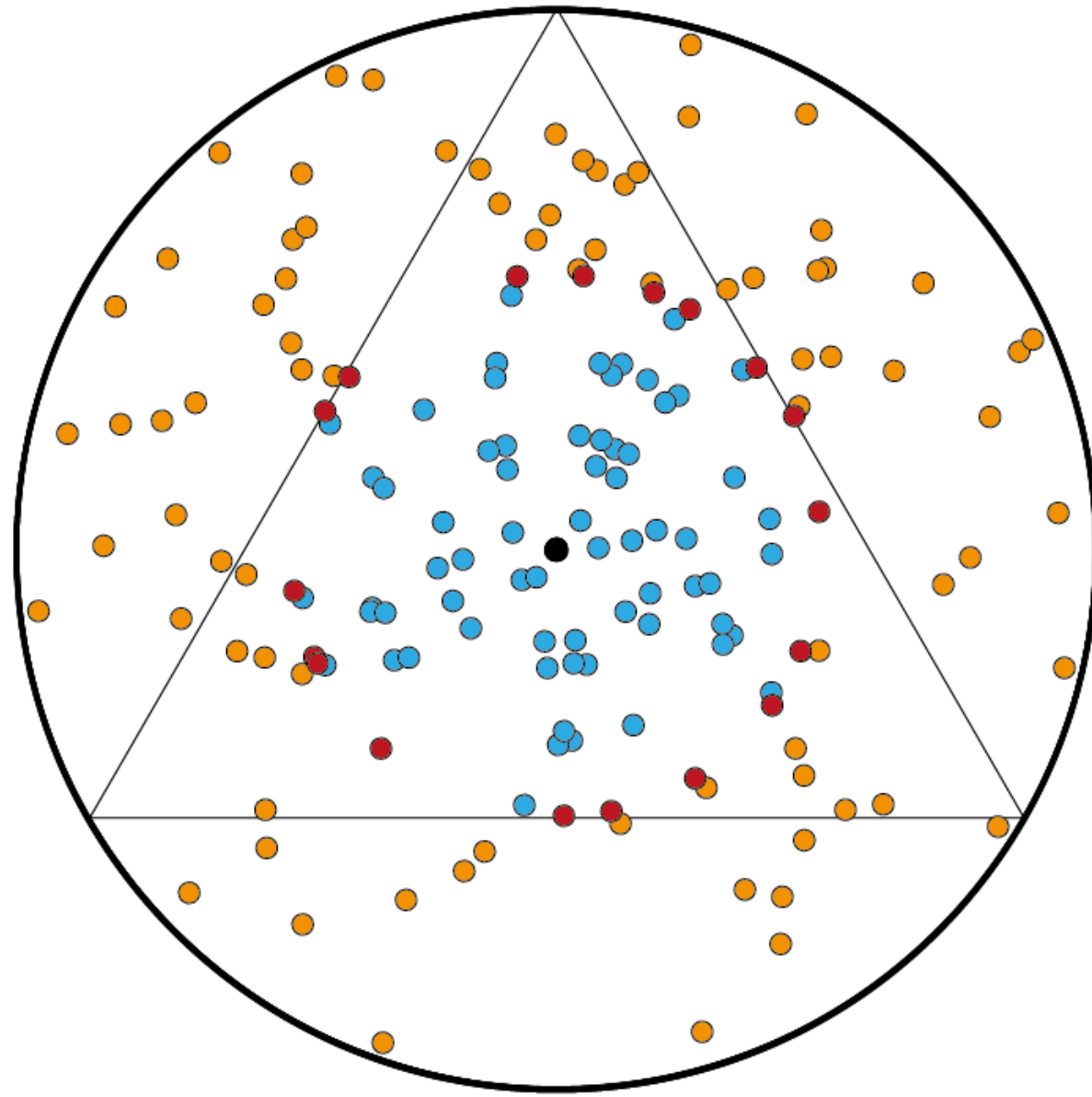


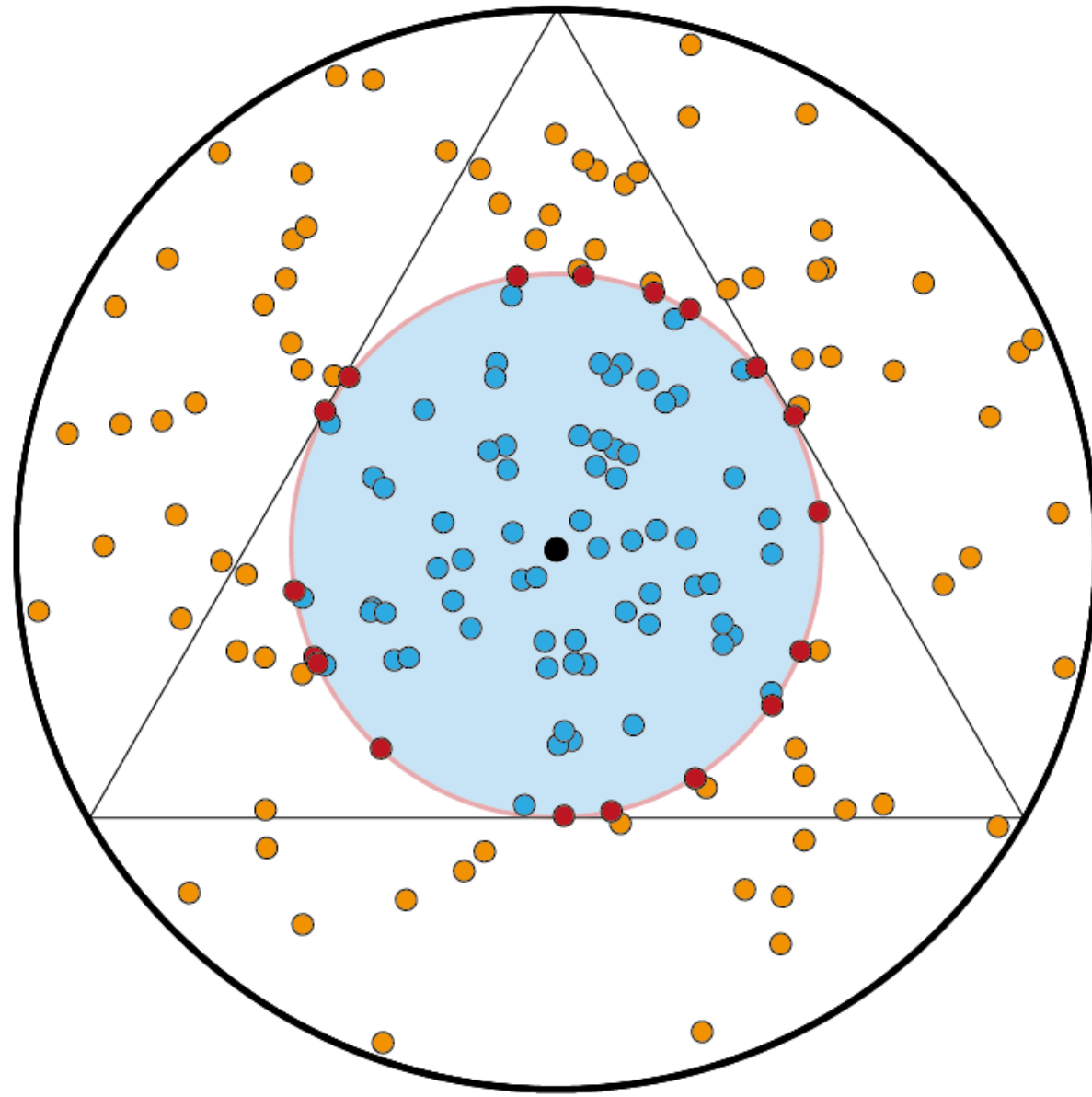


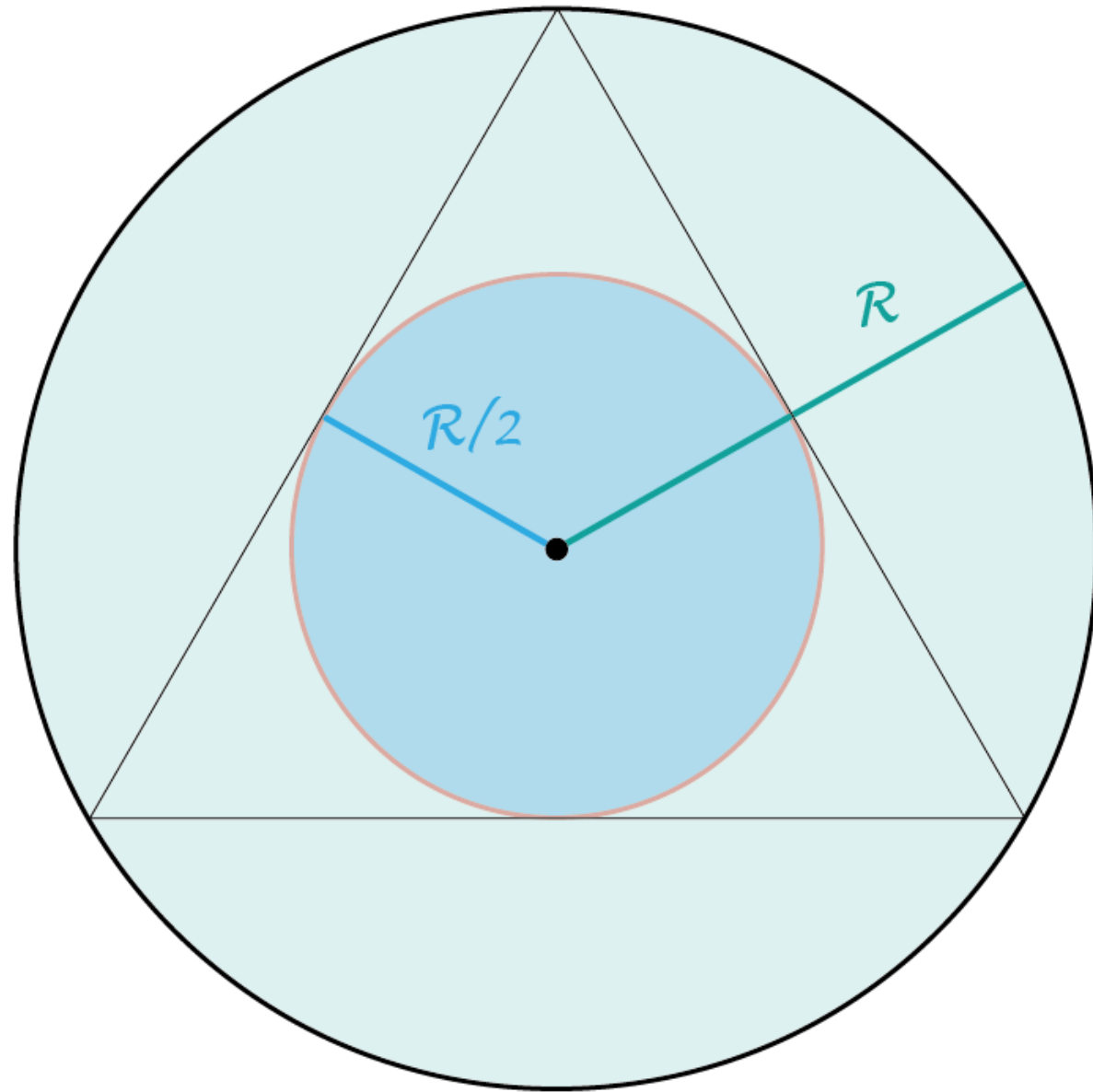


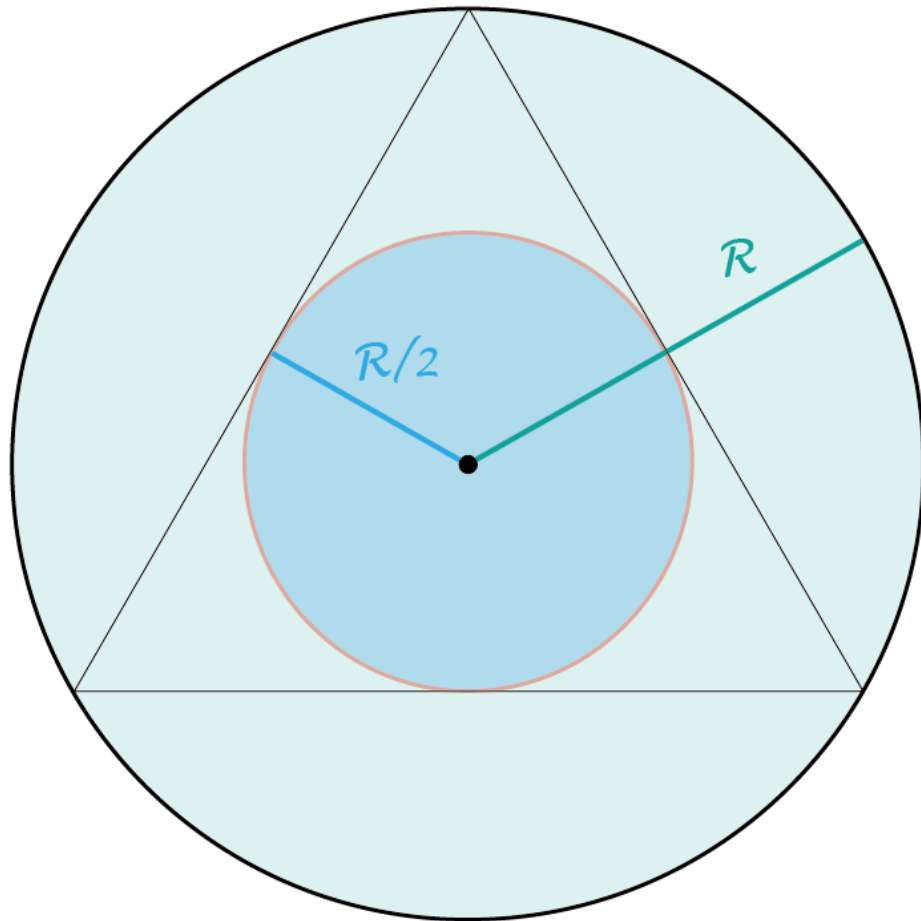












$$A_{\downarrow r} = \pi r^2 = \pi (R/2)^2$$

$$A_{\downarrow R} = \pi R^2$$

$$P = A_{\downarrow r} / A_{\downarrow R} = 1/4$$

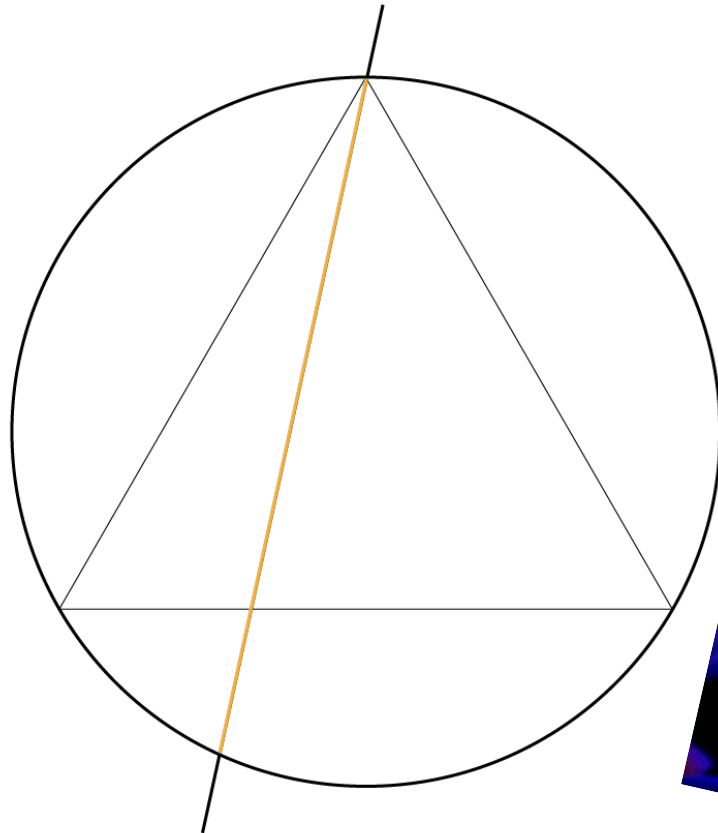


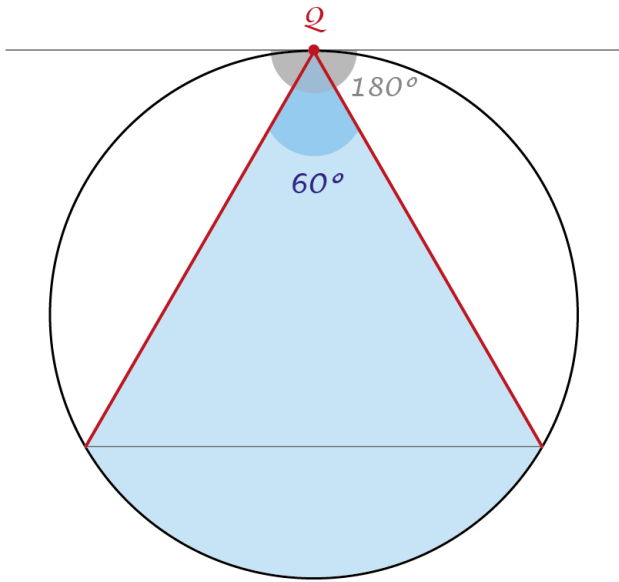


$$P=1/3$$

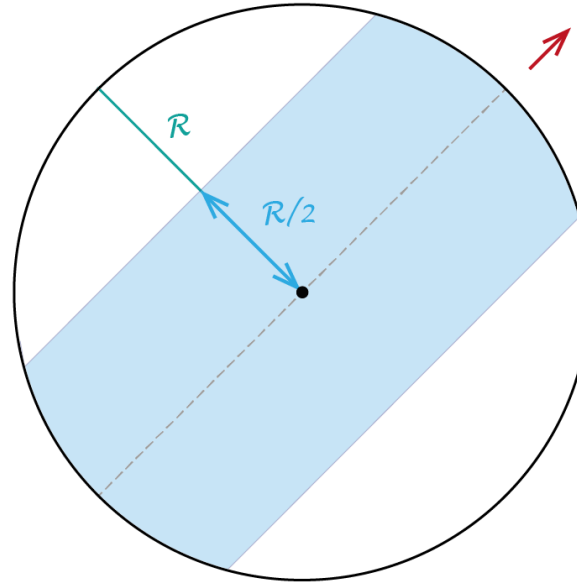
$$P=1/2$$

$$P=1/4$$



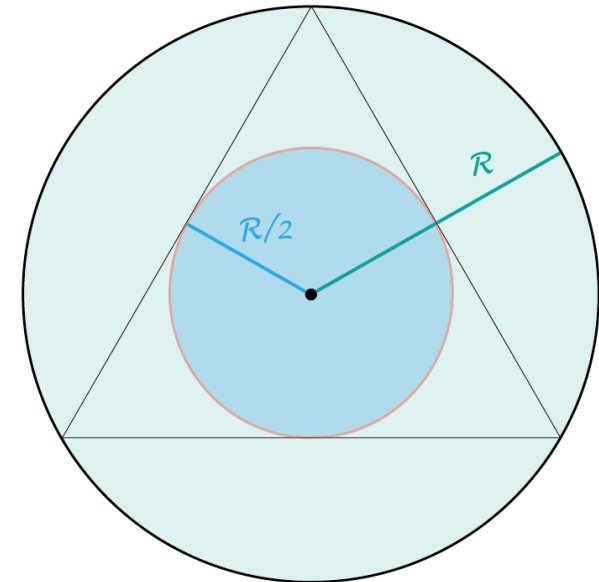


Solución 1



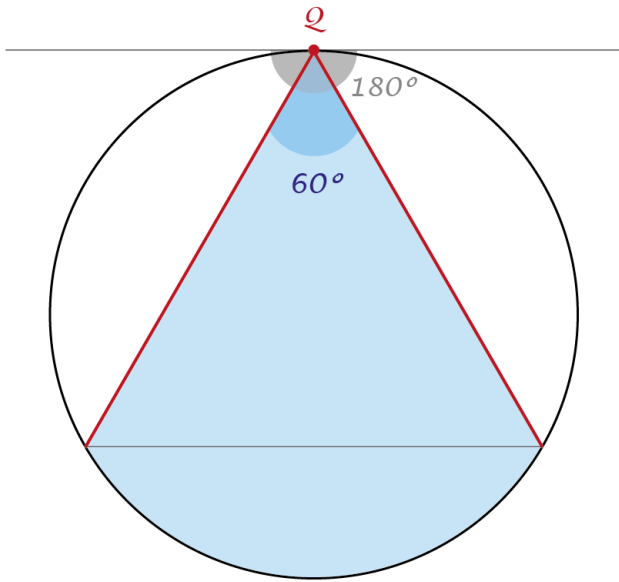
Solución 2

~~10~~

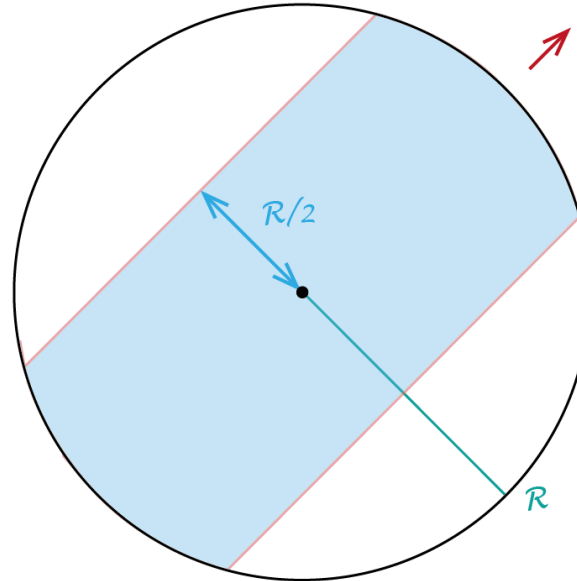


Solución 3



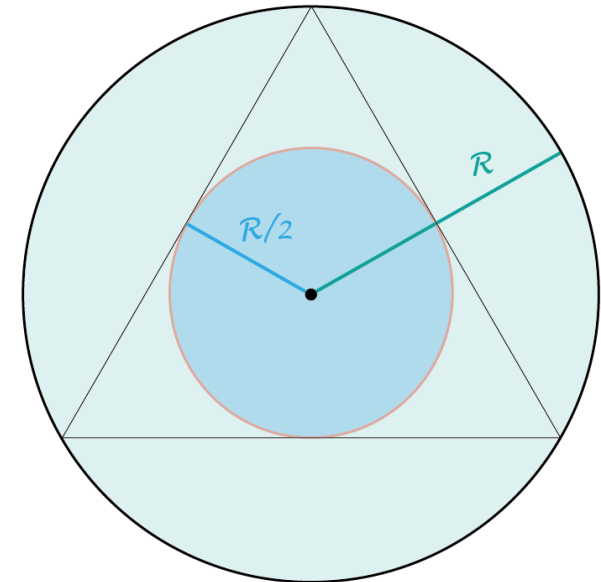


Solución 1



Solución 2

~~10~~

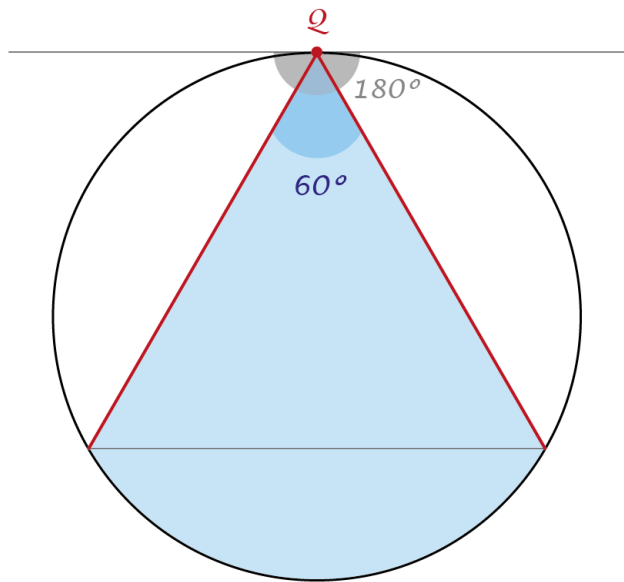


Solución 3

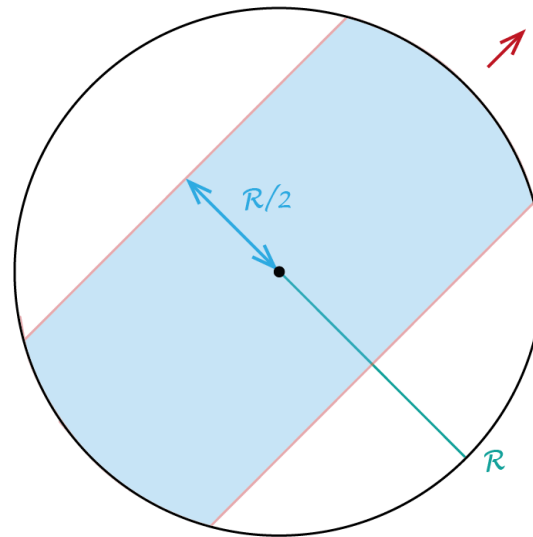


Yeeeeaaaah

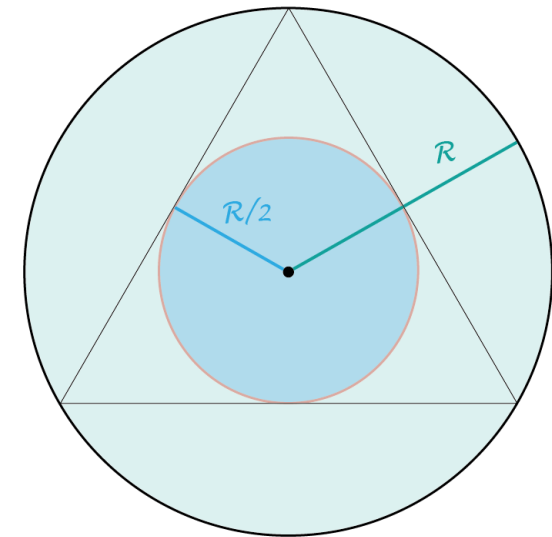
Trazamos *aleatoriamente* una cuerda dentro de un círculo.



$$P=1/3$$



$$P=1/2$$



$$P=1/4$$

Trazamos *aleatoriamente* una cuerda dentro de un círculo.

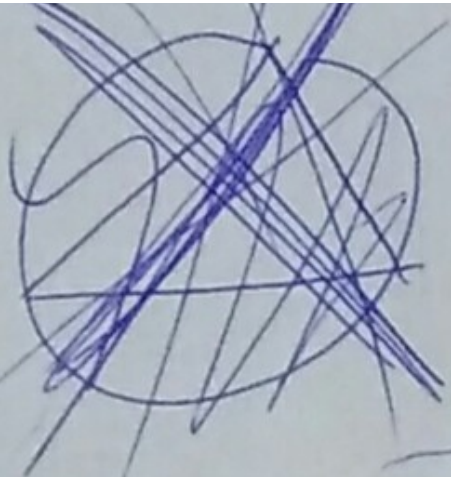
PARADOJA DE BERTRAND



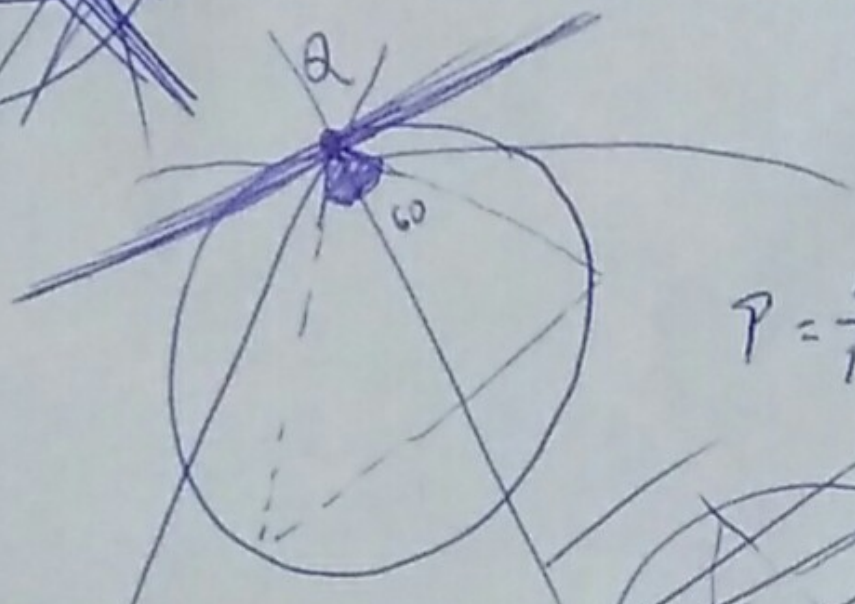
$$P=1/3$$

$$P=1/2$$

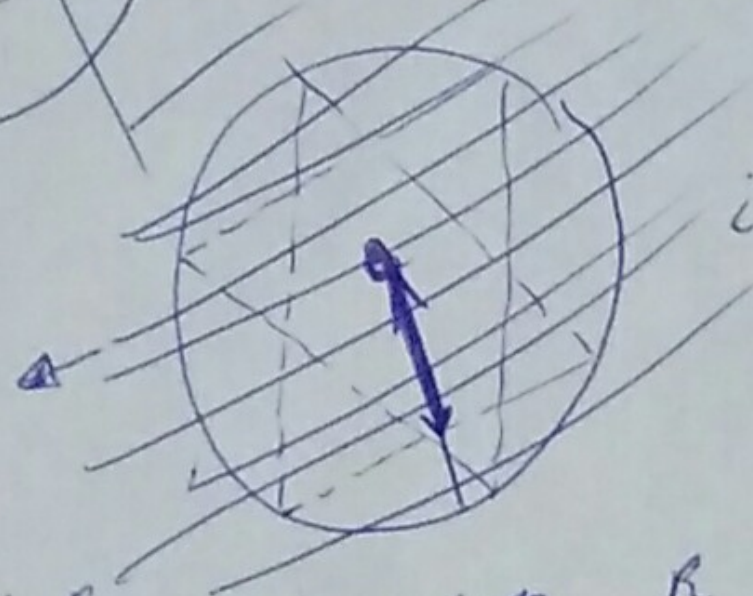
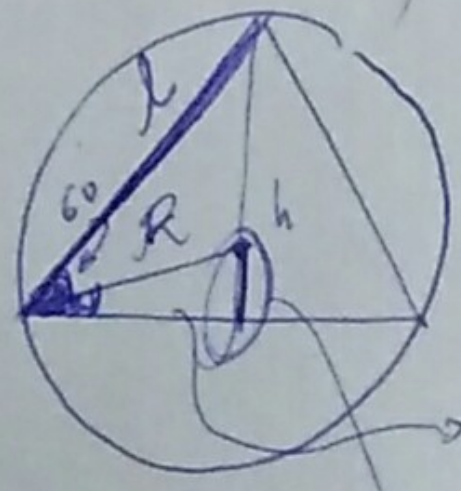
$$P=1/4$$



$$P = \frac{\text{casos favorables}}{\text{casos totales}}$$

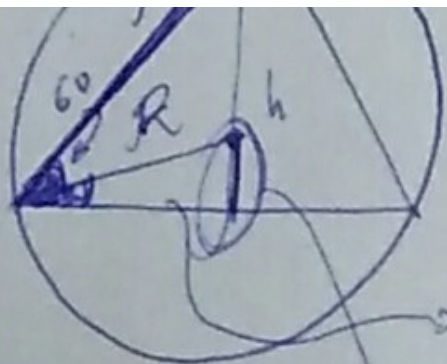


$$P = \frac{60}{180} = \frac{1}{3}$$



$$r = \frac{R}{2} ?$$

$$\rightarrow \sin 30^\circ = \frac{h-R}{R} \Rightarrow \frac{R}{2} = h-R$$



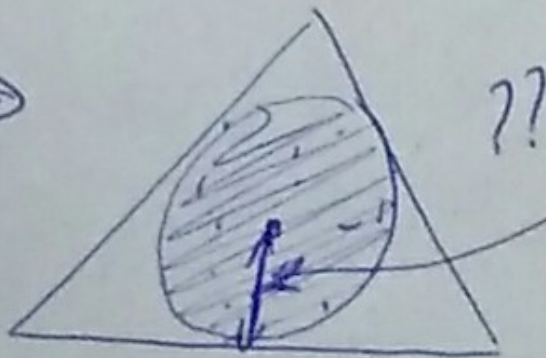
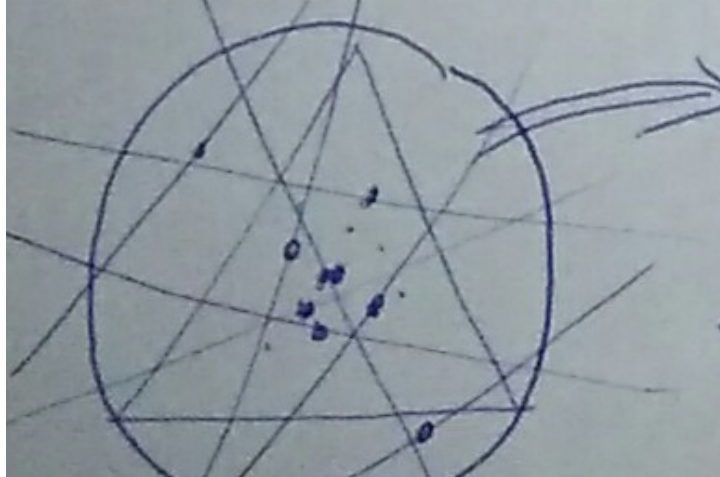
$$\sin 30^\circ = \frac{h-R}{R} \Rightarrow \text{[scribble]} \quad \frac{R}{2} = h-R$$

$$\Rightarrow h = \frac{3R}{2} = \left(\frac{R}{2}\right) + R$$

De esta manera, nos queda:

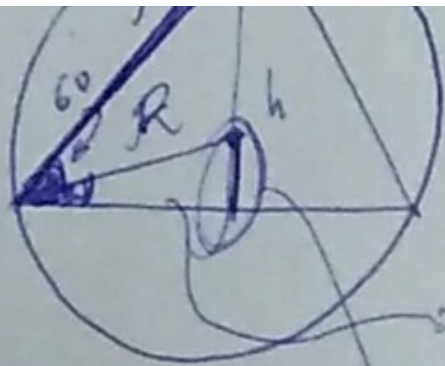
$$P = \frac{2 \cdot \frac{R}{2}}{2R} = \frac{R}{2R} = \frac{1}{2}$$

Comprobamos con
un tercer
resultado



$$P = \frac{A_p}{A_g} = \frac{1}{4}$$

$$A_p = \pi r^2 = \pi \left(\frac{R}{2}\right)^2$$



$$\sin 30^\circ = \frac{h-R}{R} \Rightarrow \text{[scribble]} \quad \frac{R}{2} = h-R$$

$$\Rightarrow h = \frac{3R}{2} = \left(\frac{R}{2}\right) + R$$

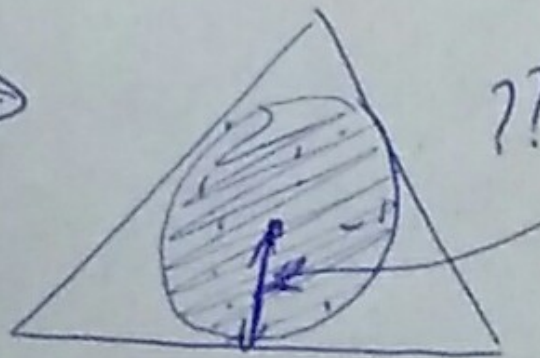
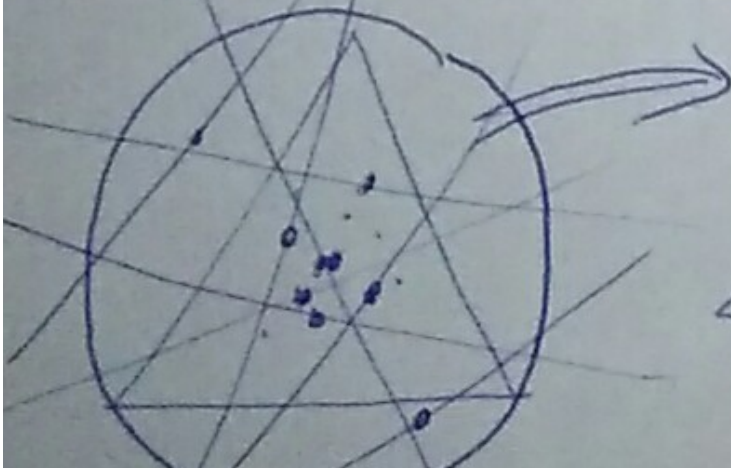
De esta manera, nos queda:

¡MUCHAS GRACIAS!

$$P = \frac{\frac{R}{2}}{2R} = \frac{R}{4R} = \frac{1}{4}$$

Comprobamos con
un tercer
resultado

$$P = \frac{A_p}{A_g} = \frac{1}{4}$$



$$A_p = \pi r^2 = \pi \left(\frac{R}{2}\right)^2$$