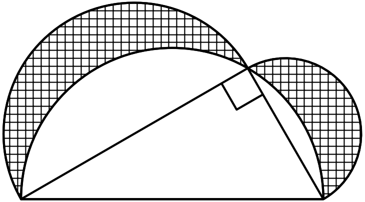
ヒポクラテスの月形（三日月）



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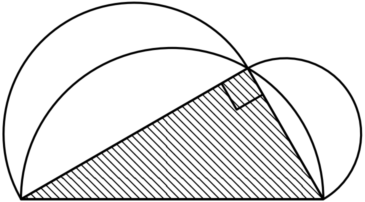
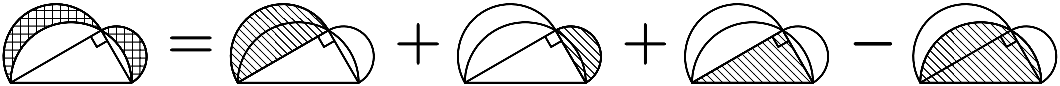
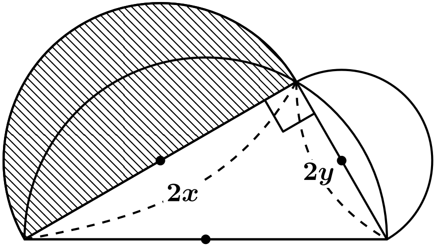


面積が等しい

ヒポクラテスの月形（三日月）



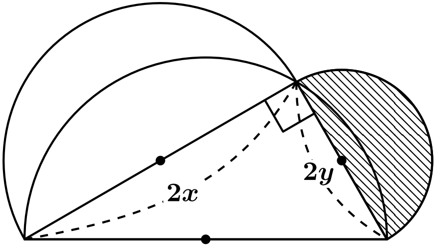
証明します



【半径が x の円】の半分なので面積は $\dfrac{\pi x^2}{2}$

円の面積 $= \pi \times$ 半径^2

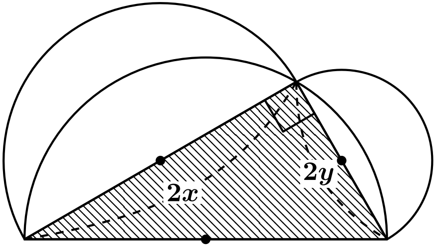
証明します



【半径が y の円】の半分なので面積は $\dfrac{\pi y^2}{2}$

円の面積 $= \pi \times$ 半径^2

証明します



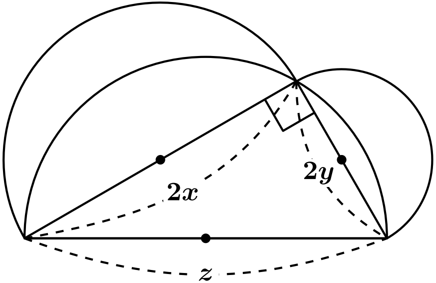
$$\text{底辺} \times \text{高さ} \div 2$$

$$= 2y \times 2x \div 2$$

$$= 2xy$$

証明します

三平方の定理を使って



$$z^2 = (2x)^2 + (2y)^2$$

$$z^2 = 4x^2 + 4y^2$$

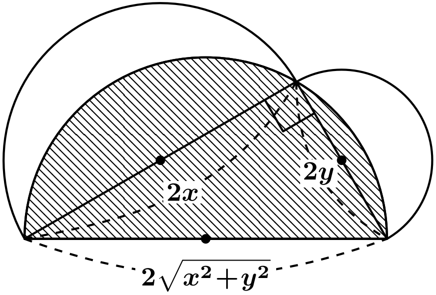
$$z = \sqrt{4x^2 + 4y^2}$$

$$= \sqrt{4(x^2 + y^2)}$$

$$= \sqrt{4}\sqrt{x^2 + y^2}$$

$$= 2\sqrt{x^2 + y^2}$$

証明します

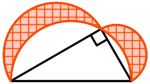


【半径が $\sqrt{x^2+y^2}$ の円】の半分なので面積は

$$\frac{\pi\sqrt{x^2+y^2}^{\,2}}{2}$$

$$=\frac{\pi(x^2+y^2)}{2}$$

証明します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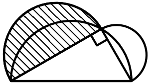
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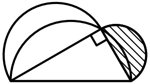
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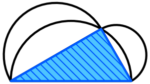
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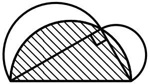

$$= \frac{\pi x^2}{2} + \frac{\pi y^2}{2} + 2xy - \frac{\pi(x^2+y^2)}{2}$$

$$= \frac{\pi x^2}{2} + \frac{\pi y^2}{2} + 2xy - \frac{\pi x^2}{2} - \frac{\pi y^2}{2}$$

$$= 2xy$$