MATH 242 — 9 Feb. 2026

Grade Example:

Prep/Practice:	~~103~~ 108	—	~~B~~ A
Projects:	2E, 3M	—	B
Final Proj:	E	—	A
Challenge:	~~2~~ 4	—	~~B~~ A

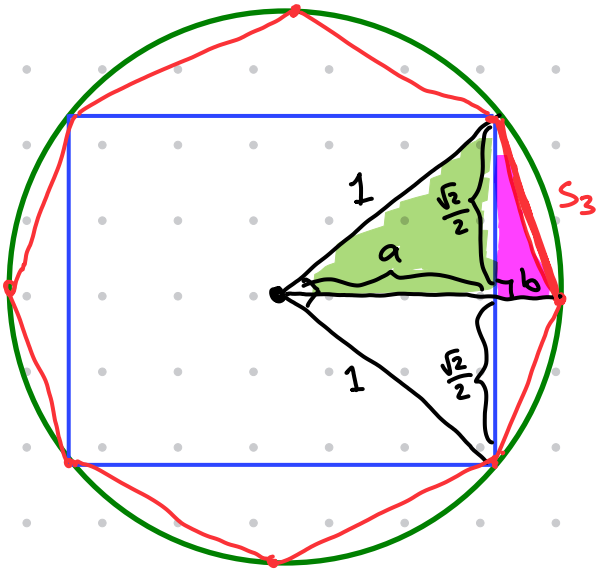
↑ ↑

B^+ A^-

How does Archimedes's method approximate π?

What picture can you draw to illustrate the method?

What questions do you have?



Square: $4 = 2^2$-gon

side length: $\sqrt{2}$

perimeter: $4\sqrt{2}$

approx: $\pi_2^i = \frac{4\sqrt{2}}{2} = 2\sqrt{2} \approx 2.82\ldots$

Octagon: $8 = 2^3$-gon

half previous side length

$a = \sqrt{1^2 - \left(\frac{\sqrt{2}}{2}\right)^2} = \frac{1}{\sqrt{2}}$

$b = 1 - a = 1 - \frac{1}{\sqrt{2}}$

side length: $s_3 = \sqrt{\left(1-\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{\sqrt{2}}{2}\right)^2}$

$= \sqrt{2-\sqrt{2}}$

perimeter: $2^3\sqrt{2-\sqrt{2}}$

approx: $\pi_3^i = \frac{2^3\sqrt{2-\sqrt{2}}}{2} = 4\sqrt{2-\sqrt{2}}$

$\approx 3.06\ldots$