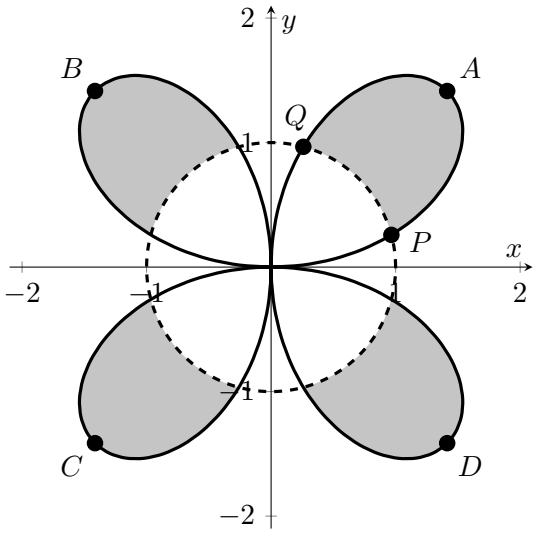
5. [12 points] A large four-leaf clover, pictured below, resides in a forest.

- The leaves of the clover are modeled by the polar curve
$$r = 2\sin(2\theta)$$
for $0 \le \theta \le 2\pi$. This is the **solid** curve in the diagram to the right.
- The polar curve
$$r = 1$$
for $0 \le \theta \le 2\pi$ is the **dashed** curve in the diagram to the right.
The leaves of the clover are light green inside of this curve, and dark green outside of it.
- All distances are measured in inches.



a. [2 points] Which of the following points labelled in the diagram above is in the portion of the polar curve $r = 2\sin(2\theta)$ traced out for $\dfrac{\pi}{2} \le \theta \le \pi$? Circle the **one** correct answer.
No justification is required.

Circle one: A B C D NONE OF THESE

b. [5 points] The points P and Q, labelled above, are two intersection points of the solid and dashed curves. Write P and Q in **polar coordinates (r, θ),** where $r \ge 0$ and $0 \le \theta \le 2\pi$.
Please show all of your work.

Answer: P: $(r, \theta) =$ _____ Q: $(r, \theta) =$ _____

c. [5 points] Write an expression involving **at most two integrals** that gives the **area**, in square inches, of the dark green part of the four-leaf clover. (This is the shaded region in the diagram above.) **Do not evaluate your integral(s).**

Answer: _____