2. [9 points] Scientists are studying the bite of several different rodents. To do this, they give a wafer cookie to the animal, and take it away after the animal takes one bite.

- r is measured in inches
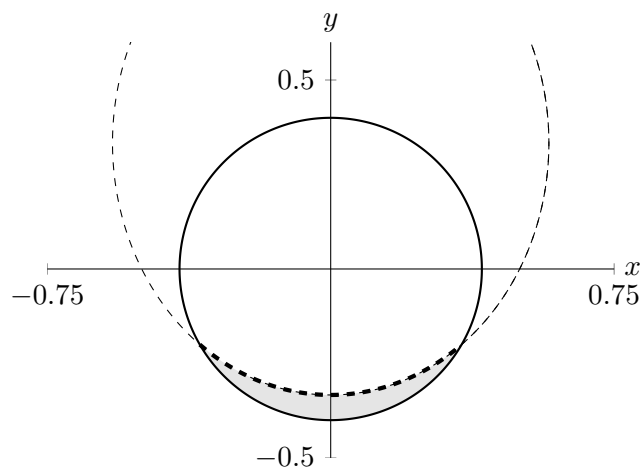- The **wafer** is modeled by the region inside the polar curve
$$r = \frac{2}{5}$$
(the **solid** line in the diagram).
- The rodent's **bite** is modeled by the region inside the polar curve
$$r = \frac{1}{2 - \sin(\theta)}$$
and inside the wafer (the **dashed** line in the diagram).
- The wafer remaining after the bite is shaded in the diagram.

a. [3 points] For what values of θ between 0 and 2π does the rodent's bite meet the edge of the wafer? Justify your answer algebraically, and give your answers in **exact** form.

Answer: _____

b. [3 points] Write, but do not evaluate, an expression involving one or more integrals that gives the area, in square inches, of the wafer remaining after the bite.

Answer: _____

c. [3 points] The bite mark in the wafer is represented by the **thick** dashed line in the diagram. Write, but do not evaluate, an expression involving one or more integrals that gives the length, in inches, of this bite mark.

Answer: _____