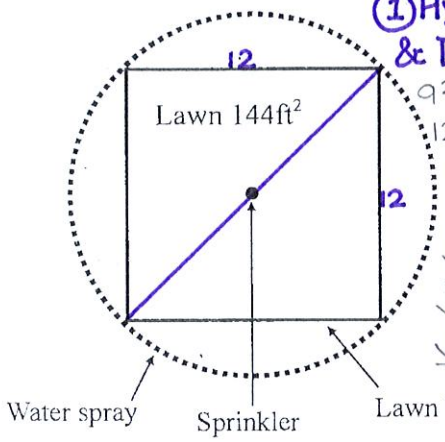
Pythagorean Application-Radicals

Big Idea: *Squaring a radical cancels the radical and results in a rational number. Example: $(\sqrt{5})^2 = 5$

*Radicals are exact, and have not been rounded.

Example:

A square yard with an area of 144 ft^2 is and surrounded by a cement patio is watered by one central sprinkler. The sprinkler creates a circular pattern, so part of the cement patio is watered as shown in the diagram. What is the area of patio watered?



① Hypotenuse & Diameter

$a^2 + b^2 = c^2$

$12^2 + 12^2 = c^2$

$144 + 144 = c^2$

$288 = c^2$

$\sqrt{288} = c$

$\sqrt{288} = d$

$\frac{\sqrt{288}}{2} = r$

② Area of Circle

$A = \pi r^2$

$A = \pi \left(\frac{\sqrt{288}}{2}\right)^2$

$A = \frac{288}{4}\pi$

$A = 72\pi$

$A \approx 226.08$

③ Area of Square (given)

144

④ Difference in ○ & □

226.08

- 144

82.08 ft^2