Cylinder Notes
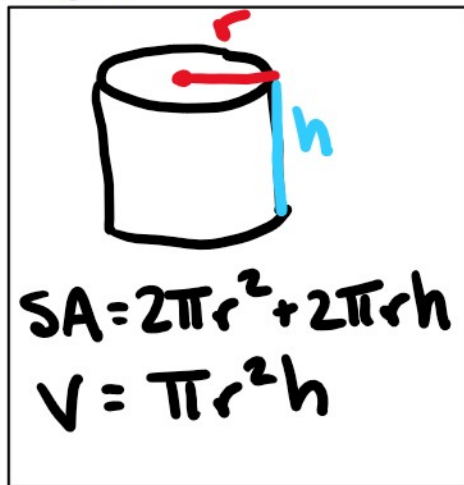
A company wants to make a cooling cylinder for a power plant using only 350 square feet of plastic. Find the dimensions and the volume of the cylinder that can hold the most liquid.

Diagram:

SA

$$SA = 2\pi r^2 + 2\pi r h$$
$$V = \pi r^2 h$$

Equation A: $350 = 2\pi r^2 + 2\pi r h$
(given info)

Equation A: $h = \dfrac{350 - 2\pi r^2}{2\pi r}$
(new version)

Equation B: $V = \pi r^2 h$
(max/min)

Equation B: $V = 175 r - \pi r^3$
(new version)

Equation B: $V' = 175 - 3\pi r^2 = 0$
(1st derivative)

$+ 3\pi r^2 \quad + 3\pi r^2$

$$\dfrac{175}{3\pi} = \dfrac{3\pi r^2}{3\pi}$$

$\pm\sqrt{18.57} = \sqrt{r^2}$

$\pm 4.31 = r$

Radius: 4.31 Height: 8.62 Volume: 502.72