Question

Surface area of the cylinder: $S_{cylinder} = 2\pi r^2 + 2\pi rh = 2\pi \cdot 36 + 2\pi \cdot 6 \cdot 18 = 288\pi$.

Surface area of the cone: $S_{cone} = \pi r\sqrt{r^2 + h^2} = 9\pi\sqrt{81 + h^2}$.

So, we will have:

$$9\pi\sqrt{81 + h^2} = 288\pi \Rightarrow$$

$$\Rightarrow \sqrt{81 + h^2} = \frac{288\pi}{9\pi} = 32 \Rightarrow h^2 = 32^2 - 81 = 943 \Rightarrow h = 30.7 \text{ cm.}$$

Answer: 30.7 cm.