$$V = h\left[0{,}5\pi r^2 - r^2 \operatorname{arcsen}\left(\frac{h}{r}\right) - h\left(r^2 - h^2\right)^{\frac{1}{2}}\right]$$

$$12{,}4\,[ft^3] = 10\,[ft]\left(0{,}5\pi(1)^2 - (1)^2 \operatorname{arcsen}\left(\frac{h}{1}\right) - h\left(1^2 - h^2\right)^{\frac{1}{2}}\right)$$

$$\frac{12{,}4}{10} = 0{,}5\pi - \operatorname{arcsen}(h) - h\sqrt{1-h^2}$$

$$\operatorname{arcsen}(h) + h\sqrt{1-h^2} + 1{,}24 - 0{,}5\pi = 0$$

$$f(h) = \operatorname{arcsen}(h) + h\sqrt{1-h^2} + 1{,}24 - 0{,}5\pi$$

$$f'(h) = \frac{d}{dh}\operatorname{arcsen}(h) + \frac{d}{dh}h\sqrt{1-h^2} + \cancel{\frac{d}{dh}1{,}24 - 0{,}5\pi} \to 0$$

$$= \frac{1}{\sqrt{1-h^2}} + \sqrt{1-h^2}\,\frac{d}{dh} + h\frac{d}{dh}\left(1-h^2\right)^{\frac{1}{2}}$$

$$= \frac{1}{\sqrt{1-h^2}} + \sqrt{1-h^2} + \frac{1}{2\sqrt{1-h^2}}\,\frac{d\left(1-h^2\right)}{dh}$$

$$= \frac{1}{\sqrt{1-h^2}} + \sqrt{1-h^2} + \frac{1}{2\sqrt{1-h^2}} \cdot (-2h) \cdot h$$

$$= \frac{1}{\sqrt{1-h^2}} + \sqrt{1-h^2} - \frac{h^2}{\sqrt{1-h^2}}$$

$$= \frac{1}{\sqrt{1-h^2}} + \frac{\left(\sqrt{1-h^2}\right)^2 - h^2}{\sqrt{1-h^2}}$$

$$= \frac{1}{\sqrt{1-h^2}} + \frac{1-2h^2}{\sqrt{1-h^2}}$$

$$\boxed{f'(h) = \frac{-2h^2+2}{\sqrt{1-h^2}}}$$

Analise do sinal

h	-1	0	1
$f(h)$	$-$	$-$	$+$

existe pelo menos um zero no intervalo $[0,1]$