Solution to the pie problem - with the help of Justin Bieber

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Abstract

In a pledge to merge the worlds of Bieber and mathematics, all variables are chosen as the boy king's bestest songs

1 Definition of problem

Mathematical definition of problem. It's fairly self explanatory which variables refer to each of Volume, Crust Area, Radius, and Height

$$BeautyAndABeat = \pi Baby^2 Boyfriend \tag{1}$$

$$AsLongAsYouLoveMe = \pi Baby^2 + 2\pi BabyBoyfriend \tag{2}$$

2 Solution

Define boyfriend in terms of Baby (from (1))

$$Boyfriend = \frac{400}{(Baby^2)} \tag{3}$$

Substitute (3) into (2)

$$AsLongAsyouLoveMe = \pi Baby^2 + \frac{800\pi}{Baby} \tag{4}$$

Differentiate with respect to Baby and set to 0 to find minimum of AsLongAsYouLoveMe

$$\begin{aligned} 2\pi Baby - \frac{800\pi}{Baby^2} &= 0 \\ 2\pi Baby^3 - 800\pi &= 0 \\ Baby^3 &= 400 \\ Baby &= \sqrt[3]{400} \\ &= 7.368 \end{aligned} \tag{5}$$

From (3)

$$\begin{aligned} Boyfriend &= \frac{400}{(Baby^2)} \\ &= \frac{400}{\sqrt[3]{400}^2} \\ &= \sqrt[3]{400} \\ &= 7.368 \end{aligned} \tag{6}$$

Thus also proving the long assumed conjecture that Baby == Boyfriend for all real values of Boyfriend and Baby