## Learner inspired questions

## 22 June 2020

## EXPONENTIAL FUNCTION QUESTION

If $3^{9x} = 64$ and $5^{\sqrt{p}} = 64$, calculate, WITHOUT the use of a calculator, the value of: $\dfrac{\left[3^{x-1}\right]^3}{\sqrt{5}^{\sqrt{p}}}$

**ANSWER**

$$3^{9x} = 64$$
$$\left(3^{3x}\right)^3 = (4)^3$$
$$3^{3x} = 4$$

$$5^{\sqrt{p}} = 64$$
$$\sqrt{5}^{\sqrt{p}} = \sqrt{64}$$
$$\sqrt{5}^{\sqrt{p}} = 8$$
$$\frac{\left[3^{x-1}\right]^3}{\sqrt{5}^{\sqrt{p}}} = \frac{3^{3x-3}}{\sqrt{5}^{\sqrt{p}}}$$

**OR/OF**

$$= \frac{3^{3x}.3^{-3}}{5^{\frac{\sqrt{p}}{2}}}$$

$$= \frac{3^{3x}}{27 \times \sqrt{5}^{\sqrt{p}}}$$

$$= \frac{\sqrt[3]{64}.3^{-3}}{\sqrt{64}}$$

$$= \frac{4}{27 \times 8}$$
$$= \frac{1}{54}$$

Type equation here.