

Question

Function: $f(x) = axe^{(bx^2)}$.

First derivate: $f'(x) = ae^{(bx^2)} + 2bax^2e^{(bx^2)}$.

So, we will have:

$$f'(x) = ae^{(bx^2)}(1 + 2bx^2) = 0 \Rightarrow$$

$$\Rightarrow x = \pm \frac{1}{\sqrt{-2b}}.$$

$$f\left(\pm \frac{1}{\sqrt{-2b}}\right) = \pm \left(\frac{a}{\sqrt{-2b}}\right) e^{(-0.5)}$$

We have maximum value $f(3) = 6$.

So:

$$x = \frac{1}{\sqrt{-2b}} = 3 \Rightarrow b = -\frac{1}{18}$$

$$f(x) = 3ae^{-0.5} = 3ae^{-0.5} = 6 \Rightarrow a = 2e^{0.5}$$

We have that $a = 2e^{0.5}$ and $b = -\frac{1}{18}$.

Answer: $a = 2e^{0.5}$ and $b = -\frac{1}{18}$.