Very short answer questions

1. Calculate the derivatives $f'(x)$ for the following functions:
   
   (a) 4 marks \( f(x) = \sin \left( \log(x)^2 + e^{x^2} \right) \)
   
   Answer:

   (b) 4 marks \( f(x) = \frac{(x-3) \sqrt[3]{x^2+2x}}{(x^3-4) \log(x)} \) \text{ DO NOT SIMPLIFY }
   
   Answer:
2. 6 marks A vending machine stands in an office buildings and sells $q$ cans of soft drink an hour for the price of $p$ dollars a can and the demand equation is given by $p^2q + q^2 = 110$. Currently the machine sells a can for $1$ a can. Use the price elasticity of demand to determine whether the price of a can should be lowered or raised in order to increase their revenue.

HINT: $\sqrt[4]{441} = 21$.

| Answer: |

Long answer questions - You must show your work

3. 6 marks Consider the curve given by $y^2 - xy + x^3 = 1$. Find $\frac{d^2f}{dx^2}(0) = f^{(2)}(0)$ assuming that $y = f(x)$ near $(0, -1)$.

| Answer: |