Short answer questions — you must show your work

1. 2 marks Evaluate $f'(x)$, where $f(x) = \frac{\cos x}{x^2 + 2}$.

   Answer:

2. 2 marks Evaluate $f'(x)$, where $f(x) = \sin(e^{x^3})$.

   Answer:

3. 2 marks Evaluate $f^{(2)}(x)$, where $f(x) = \cos(x^2)$.

   Answer:
Long answer question — you must show your work

4. [4 marks] An interstellar spaceship travels from Alpha Centauri A to Epsilon Eridani. Due to galactic politics, it’s trajectory is given by the curve \((y - 2)^2 + 2x^2 = 1\). The pilot wish to send a mail probe to Earth, located at the point \((0, 0)\). Given that the probe will fly along the tangent to the ships trajectory at the point of departure, check if the probe will get to Earth assuming the pilot release it at the point \(\left(\sqrt{\frac{3}{8}}, \frac{3}{2}\right)\).

Answer:
