

Show the following:

1. $f(x) = 2x + 2$ is $\mathcal{O}(x)$

2. $f(x) = 7x^3$ is $\mathcal{O}(x^5)$

3. $f(x) = \ln(x) + \sqrt{x}$ is $\mathcal{O}(x^2)$

4. $f(x) = x^2$ is $\mathcal{O}(e^x)$

5. $f(x) = x2^x$ is $\mathcal{O}(3^x)$