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Q1. (12p) Find the domains of the following functions,

a) $f(x) = \sqrt{2 + \sqrt[3]{x}}$, b) $f(x) = \ln(3 - x)$. **Q2.** (16p) a) Is the function $f(x) = x \sin(\frac{1}{x})$ continuous at x = 0? Why? b) If it is not, does it have a continuous extension at x = 0? If your answer is yes, find

the continuous extension.

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Q3. (13p) Use the Intermediate Value Theorem to show that the equation $\cos x = x$ has \bigcirc at least one solution. Explain your answer.

a)
$$y = \frac{1+|x|^3}{x^3-1}$$
, b) $y = \frac{x^2-2x}{x-1}$.

Q4. (16p) Find the asymptotes of the functions a) $y = \frac{1+|x|^3}{x^3-1}$, b) $y = \frac{x^2-2x}{x-1}$. PAGE3 Q5. (14p) Sketch the graph of the function f(x) = |x-3|+2 using techniques of shifting

Q5. (14p) Sketch the graph of the function f(x) = |x-3|+2 using tech and reflecting. PAGE4 Q6. (14p) Find the inverses of the following functions a) $y = \frac{1+e^{3x}}{4}$, b) $y = \sin(\sqrt{x})$. PAGE5 Q7. (15p) Evaluate the following limits (Do not use L'Hospital's rule) a) $\lim_{x\to 0} \frac{\tan(2x)}{x}$, b) $\lim_{x\to 4} \frac{4-x}{5-\sqrt{x^2+9}}$.