MATH31B: Week 2 discussion

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Discussion Questions

Question 1. Let $f(x) = x + \cos(x)$ and $g(x)$ it's inverse. Calculate $g(1)$ and $g'(1)$.

Question 2. Calculate $\int \frac{\cos(x)}{2\sin(x)+3} dx$. Hint: u-substitution.

Question 3. Find the derivative of $f(x) = \frac{x(x^2+1)}{\sqrt{x+1}}$.

Extra Questions

Question 4. Let $f(x) = x^3 + 2x + 4$ and g it's inverse. Without finding a formula for $g(x)$ (no seriously, don't even try) calculate $g(7)$ and then $g'(7)$.

Question 5. Calculate the following derivatives

(a) $y = \ln(x^2 6^x)$

(b) $y = \ln\left(\frac{x+1}{x^3+1}\right)$

(c) $y = 8^{\cos(x)}$

(d) $y = x^{e^x}$

Question 6. Prove that $\frac{d}{dx}(\arcsin(x)) = \frac{1}{\sqrt{1-x^2}}$. Remember that $\arcsin(x)$ is the inverse of sin after restricting the domain to $[-\pi/2, \pi/2]$.