MATH 242 - Quiz 3 REMIX

02/15/2024

1. **[4 pts]** True or False?

   (a) If $\cos(2x) = \frac{1}{2}$ then $\sin(x) = \frac{1}{2}$ or $\sin(x) = -\frac{1}{2}$ True

$\frac{1}{2} = \cos(2x) = 1 - 2\sin^2(x)$

$\sin^2(x) = \frac{1}{4}$

   (b) If $\sin(x) = -\frac{1}{2}$ then $x = -\frac{\pi}{6}$ False

   (c) If $\cos(x) = \frac{1}{2}$ then $\csc(x) = 2$ False

   (d) If $\cos^{-1}(x) = \frac{\pi}{4}$ then $x = \frac{\sqrt{2}}{2}$ True

2. **[3 pts]** Evaluate the limit:

$$\lim_{x\to 1} \frac{\sqrt{x+3}-2}{x^2-1} \qquad \left(= \frac{\sqrt{4}-2}{1^2-1} = \frac{0}{0} \right)$$

$$= \lim_{x\to 1} \frac{\frac{1}{2\sqrt{x+3}}}{2x} = \frac{\frac{1}{2\sqrt{4}}}{2} = \frac{\frac{1}{4}}{2} = \frac{1}{8}$$

3. **[3 pts]** Evaluate the limit:

$$\lim_{x\to 0} \frac{e^{2x}-e^{x}}{x} \qquad \left(= \frac{e^0-e^0}{0} = \frac{0}{0} \right)$$

$$= \lim_{x\to 0} \frac{2e^{2x}-e^{x}}{1} = \frac{2-1}{1} = 1$$