Name:
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(1) [5 points] Evaluate the limit, if it exists: $\lim_{x\to 7} \dfrac{\sqrt{x+2}-3}{x-7}$. $\sim \frac{0}{0}$

$$\lim_{x\to 7} \frac{\sqrt{x+2}-3}{x-7}$$

$$= \lim_{x\to 7} \frac{\sqrt{x+2}-3}{x-7} \cdot \frac{\sqrt{x+2}+3}{\sqrt{x+2}+3}$$

$$= \lim_{x\to 7} \frac{x+2-9}{(x-7)(\sqrt{x+2}+3)}$$

$$= \lim_{x\to 7} \frac{\cancel{(x-7)}}{\cancel{(x-7)}(\sqrt{x+2}+3)}$$

$$= \frac{1}{6}$$

(2) [5 points] Use the Squeeze Theorem to show that $\lim_{x\to 0} x^4 \cos\left(\dfrac{2}{x}\right) = 0$.

$$-x^4 \le x^4 \cos\left(\tfrac{2}{x}\right) \le x^4$$

Since $\lim_{x\to 0} (-x^4) = 0 = \lim_{x\to 0} x^4$,

by the Squeeze Theorem, $\lim_{x\to 0} x^4 \cos\left(\tfrac{2}{x}\right) = 0$.

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(3) [5 points] Find the limit: $\lim_{t\to 0} \frac{\tan(6t)}{\sin(2t)}$ $\sim$ "$\frac{0}{0}$"

$$\lim_{t\to 0} \frac{\tan(6t)}{\sin(2t)}$$

$$= \lim_{t\to 0} \frac{\left(\frac{\sin(6t)}{\cos(6t)}\right)}{\sin(2t)}$$

$$= \lim_{t\to 0} \frac{\sin(6t)}{6t} \cdot \frac{1}{\left(\frac{\sin(2t)}{2t}\right)} \cdot \frac{1}{\cos(6t)} \cdot \frac{6t}{2t}$$

$$= 1 \cdot \frac{1}{1} \cdot 1 \cdot 3$$

$$= 3$$