

Quiz 1      Calculus 1      9/21/2015

1. Fill each blank below with a limit law justifying that equality. Each blank is worth 1 point.

Difference Law

$$\lim_{x \rightarrow 2} 5x^2 - 3 = \lim_{x \rightarrow 2} (5x^2) - \lim_{x \rightarrow 2} 3$$

Constant multiple Law

$$= 5 \lim_{x \rightarrow 2} (x^2) - \lim_{x \rightarrow 2} 3$$

Great!

Power Law

$$= 5 \left( \lim_{x \rightarrow 2} x \right)^2 - \lim_{x \rightarrow 2} 3$$

LAW X!

$$= 5(2)^2 - \lim_{x \rightarrow 2} 3$$

Constant Law

$$= 5 \cdot 4 - 3$$

$$= 20 - 3$$

$$= 17$$

MATH ...

2. [5 pts] Evaluate the following limit, carefully identifying which limit law you use at each step:

$$\begin{aligned}\lim_{x \rightarrow 2} \sqrt{9 + 2x^3} & \stackrel{\text{Power Law}}{=} \sqrt{\lim_{x \rightarrow 2} (9 + 2x^3)} \\ & \stackrel{\text{Sum Law}}{=} \sqrt{\lim_{x \rightarrow 2} 9 + \lim_{x \rightarrow 2} 2x^3} \\ & \stackrel{\text{Const. Law}}{=} \sqrt{9 + \lim_{x \rightarrow 2} 2x^3} \\ & \stackrel{\text{Const. Multi. Law}}{=} \sqrt{9 + 2 \lim_{x \rightarrow 2} (x^3)} \\ & \stackrel{\text{Power Law}}{=} \sqrt{9 + 2 \left( \lim_{x \rightarrow 2} x \right)^3} \\ & \stackrel{\text{Const. Law}}{=} \sqrt{9 + 2(2)^3} \\ & = \sqrt{9 + 16} \\ & = \sqrt{25} \\ & = 5\end{aligned}$$