

NAME: \_\_\_\_\_

Student id: \_\_\_\_\_

Standard exam instructions apply. In particular, no calculators, no communication devices, and no notes except as  $3 \times 5$  file card, written on both sides. Also, all notation must be correct, with “=”, “lim”, etc. everywhere they are supposed to be, and nowhere they are not supposed to be. Write answers on this page. Use the back if necessary.

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1. (7 points) Differentiate the function  $h(x) = \cos(3x^2 - 16x)$ . (You need not do this directly from the definition.)

2. (7 points) Differentiate the function  $w(t) = \frac{\sin(t)}{3t^4 + t + 6}$ . (You need not do this directly from the definition.)

3. (6 points) Find the exact value of  $\lim_{x \rightarrow 3} \frac{x-3}{x^2 + x - 12}$ , or explain why it does not exist. (This problem is not primarily about notation, but **notation counts**.)