**AP Calculus**

**Limits at Infinity Project**

**All projects can be presented as a posterboard, booklet, PowerPoint, or video (more creative ideas are not only tolerated but encouraged). Grading will be based on accuracy and appearance.**

If *f*(*x*) = *x*, *g*(*x*) = *x*2, *h*(*x*) = *x*3, and *j*(*x*) = f(*x*) +g(x) + h(*x*), find:

*f*(1) *g*(1) *h*(1) *j*(1) *f*(1)*/j*(1) *g*(1)/*j*(1) *h*(1)/*j*(1)

*f*(100) *g*(100) *h*(100) *j*(100) *f*(100)*/j*(100) *g*(100)/*j*(100) *h*(100)/*j*(100)

*f*(10000) *g*(10000) *h*(10000) *j*(10000) *f*(10000)/*j*(10000) *g*(10000)/*j*(10000) *h*(10000)*/j*(10000)

Consider infinitely large values of x. What would happen in the final three columns?

Pick three new functions for *f*, *g*, and *h* (each being a monomial of a degree different than the others) and repeat the process. Let j(x) now be the sum of your new *f*, *g*, and *h*. Do you get the same result in the new *h*(*x*)/*j*(*x*)? Would it be the same regardless of the choice of *f*, *g*, and *h*? Explain why you think so.

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