**WORKSHEET XIV**

 **L’Hôpital’s Rule**



[Marquis Guillaume de l’Hôpital](http://www-history.mcs.st-and.ac.uk/Biographies/De_L%27Hopital.html) (1661 – 1704)

***I*** Evaluate each of the following limits, using l’Hôpital’s rule when appropriate:





















 (where *a, b, c, d* are positive constants)







 













(*V*) Explain what happens if one tries to use l’Hopital’s rule on the following: 

***II*** For each of the following, find the value for *c* that makes the function continuous at x = 0.





***III*** The *Gamma Function*, (n), is defined in terms of the integral of the function f(x) = xn-1e-x for n > 0. Show that for any fixed value of *n*, the limit of f(x) as x → ∞ is 0.

*The notion of infinity is our greatest friend; it is also the greatest enemy of our piece of mind.*

- James Pierpont