
1.

(a) Compute $\lim_{x\to\infty} \dfrac{2x^x}{(x+1)^x}$.

(b) Compute the same limit *without* using L'Hôpital's rule.

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2. Expand the following expressions.

$$\text{(a) } \sum_{m=1}^{6} \frac{2}{m} \quad \text{(b) } \sum_{i=3}^{7} i^2 \quad \text{(c) } \sum_{\ell=1}^{k} 2^\ell \quad \text{(d) } \sum_{n=1}^{k} \frac{1}{n^s}$$

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3. Rewrite the following expressions in 'sigma notation.'

(a) $1+2+3+4$ (b) $9+16+25+36+49$
(c) $1-2+3-4+5-6+7-8$ (d) $1+r+r^2+r^3+\cdots+r^n$

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4. Consider $f(x) = x^2 + 1$ on the interval $[0, 4]$. Let $n = 4$.

(a) Sketch the graph of $f(x)$.

(b) Divide the interval into $n = 4$ equal subintervals. What is the length of each subinterval?

(c) Indicate the endpoints of each subinterval on your graph from part (a).

(d) Draw the rectangles corresponding to the left Riemann sum for $n = 4$.

(e) On the same graph, draw the rectangles for the right Riemann sum.

(f) Compute the left and right Riemann sums.