

34) a) Verify that

$$2^x = \exp(\log(2^x)) = \exp(x \cdot \log(2)).$$

b) Calculate  $\frac{d}{dx} 2^x$ , using the formula from a).

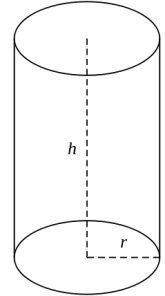
c) Calculate  $\frac{d}{dx} x^x$ .

35) Using Newton's method and a start value of 0, determine a zero of the function  $\exp(x) + x$  through 5 iterations.

36) A cylinder of radius  $r$  and height  $h$  has volume  $V = \pi \cdot r^2 h$  and surface area  $A = 2\pi r \cdot h + 2\pi r^2$ .

a) Express the height  $h$  as a function of the radius  $r$  and the volume. Use this to determine (for fixed volume  $V = 1$ ) the surface area as a function  $A(r)$  of the radius  $r$ .

b) Find the value for  $r$  that minimizes surface area for fixed volume  $V = 1$ .



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