

[exponential + logarithmic functions]

1. Evaluate completely:
 - a. $\log_3 \frac{1}{9} =$
 - b. $\log_7 49 =$
 - c. $-3 \log_m m^2$
 - d. $\log 100^3$
 - e. $10^{\log 1000}$
 - f. $\log x = -2$
2. Solve for x :
 - a. $\log x = -2$
 - b. $\log_{15} 100 = x$
3. Evaluate $\log_3 2.7 + \log_3 90$
4. Express as a single logarithm: $\log_m \sqrt[3]{d} + \log_m b^2 - a \log_m c$
5.
 - a. Express in logarithmic form: $f^g = h$
 - b. Express in exponential form: $m = \log_g t$
6. Solve for m to 3 decimal places: $\log m = 0.583$
7. Solve for x and verify: $\log_{12}(3x + 1) + \log_{12}(x + 4) = 2$
8. Given the formula $A = P(1 + i)^n$, where n is the number of interest periods, find the number of **years** it takes for \$500 to grow to \$800 at 5% per year, compounded monthly.
9. Solve: (Give answer to 3 decimal places and state any restrictions if necessary)
 - a. $5^{3x-2} = 2^{2x}$
 - b. $2 \log_5(x + 1) = \log_5 9$
10. A type of mushroom (according to Denis) grows at a rate of 30% every 6 hours. How big would a 1.5 cm high mushroom be after 1 day of growth?
11.
 - a. Sketch $y = \left(\frac{1}{2}\right)^x$, labelling any significant points.
 - b. What is the domain of this function?
 - c. What is the range of this function?
 - d. Use a different colour and sketch the inverse.
 - e. If there are any asymptotes, what would be the equation(s)?
12. When mountain climbing, the distance above sea level, d in kilometers, is given by $d = \frac{500 \log P -}{27}$, where P is the atmospheric pressure in kPa. If we climb 2000 m up Whistler Mountain, calculate the change in pressure we would experience.
13. The pedals of a bike are on a n axle that is 25 cm above the ground. Each of the pedals is 20 cm away from the axle and they are rotating at 18 cycles per minute.
 - a. Draw a neat, labelled graph showing the height of 1 pedal above the ground, assuming that it starts at its lowest position at $t = 0$ s.
 - b. Write an equation in terms of sine.
 - c. If you pedal at a constant speed for $\frac{1}{2}$ an hour, how high will the pedal be?
14. Under ideal conditions, a Hibiscus flower bud will double in size every 8.5 hours. How long will it take a 2.6 cm bud to grow to 7 cm.