AXIOM HSC TUTORING

Year 11 Mathematics Advanced

Topic: Exponential and Logarithmic Functions (4 of 4)
Review Questions: Mixed one-off exam questions
Term 3, 2026

How to use this set

These are real past-paper questions on exponential and logarithmic functions that do not fit any one recurring pattern: genuine one-offs. They are here so you also meet the rarer, less predictable exam questions. Work through them once you are solid on the patterns in the main review docs. Every question you get wrong or struggle with goes in your **Mistakes Log**.

Mixed one-off exam questions

Q1 Moriah 2021 Trial Q20(a) · **1 mark**

A function is defined by $f(x) = 2^{-x} + 1$. Complete the table of values below.

x	0	1	2
$f(x)$			

Q2 Blacktown Boys 2020 Trial Q24(a) · **1 mark**

Given that $y = \log_e(2^x - x)$, complete the table below by finding the missing value of y to 3 decimal places.

x	1	1.5	2	2.5	3
y	0	0.284	0.693		1.609

Q3 Knox 2021 Trial Q4 · **1 mark**

When evaluated, $\log_3 100$ lies between which pair of consecutive integers?

(A) 0 and 1

(B) 1 and 2

(C) 4 and 5

(D) 33 and 34

Q4 Gosford 2024 Prelim Q13 · **4 marks**

(a) Explain, using exponentials, between which 2 consecutive integers the value of $\log_3 30$ must lie.

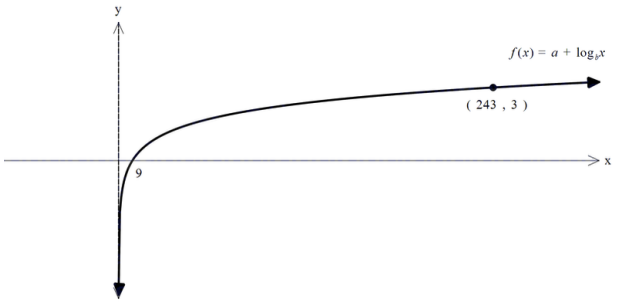
(b) Then, by first expressing it in terms of $\log_{10}$, find the value of $\log_3 30$ correct to 2 decimal places.

Q5 Caringbah 2021 Trial Q38 · **2 marks**

Simultaneously solve the equations $\log_{10}(2 - x) - \log_{10} y = 1 - \log_{10} 2$ and $\log_{10} 2x = \log_{10} y$.

Q6 International Grammar 2021 Prelim Q22 · **3 marks**

For the function $f(x) = a + \log_b x$, the x-intercept is 9 and $f(x)$ passes through the point $(243, 3)$ as shown below.



Find the values of a and b.

Q7 Riverview 2023 Trial Q18 · **3 marks**

Solve the pair of simultaneous equations:

$$\log_2 x + \log_2 y = 3 \quad \ldots (1)$$

$$\log_x y = 2 \quad \ldots (2)$$

Q8 Cherrybrook Tech 2021 Trial Q26(b) · **3 marks**

From a packet of mixed seeds it was estimated that the probability of any seed planted yielding a red rose was 0.02.

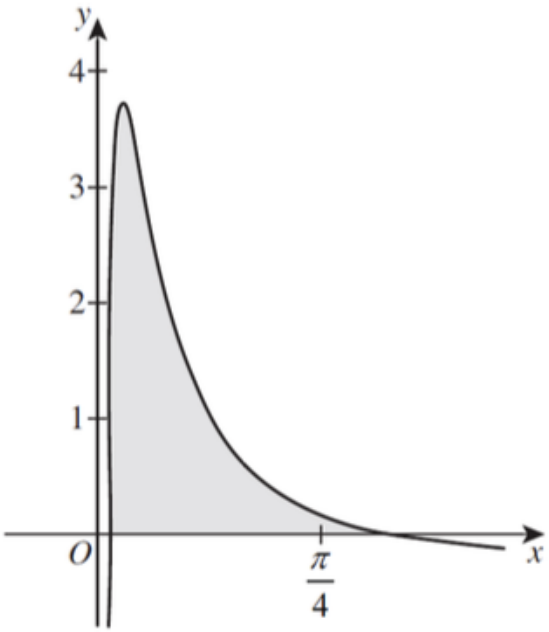
How many seeds must be planted for you to be at least 98% certain of obtaining at least one red rose?

Q9 Presbyterian 2023 Prelim Q37 · **3 marks**

Solve $e^{2\ln x} = 8 - 2x$.

Q10 Caringbah 2025 Trial Q28(b) · **2 marks**

The graph of $y = \dfrac{-\sin(\ln x)}{kx}$ for $0 < x \leq 1$ is shown below.



Show that one of the x-intercepts has a value of $e^{-\pi}$.

Q11 Gosford 2024 Trial Q26 · **3 marks**

Show that $\log_e(1 + \sin x) - \log_e(1 - \sin x) = 2\log_e(\sec x + \tan x)$.