Answer Key

Class 9 Mathematics · Chapter 2 · Logarithms

Quick answers

Paper	Source	MCQ	Short question answer
Paper 1	2025 · 2nd Exam	**D**	M = 100
Paper 2	2025 · Model Paper	**C**	t ≈ 36.65 yrs (year ≈ 2052)
Paper 3	2026 · 1st Exam · Set B	**A**	≈ 4 times
Paper 4	2026 · 1st Exam · Set D	**B**	≈ 5 times
Paper 5	2026 · 1st Exam · Set M	**D**	t ≈ 22.4 years
Paper 6	2026 · Model Paper	**B**	L = 30
Paper 7	2025 · Annual · Old Curr.	**D**	n = −7/3; x = 6
Paper 8	2025 · Annual · Set 1	**A**	t = 20 log(200/M); t ≈ 6.02 yrs
Paper 9	2025 · Annual · Set 2	**B**	t = ln(P/2500)/0.09; t ≈ 15.40 yrs

Each paper has one MCQ and one short question on this chapter (Paper 7 has two short questions: the main one and its OR). Worked solutions for every question follow. Numerical answers are rounded to 2 decimal places unless the question asks for a whole number.

Paper 1

2025 · 2nd Exam

Q2 (MCQ). 5.67×10^4 in standard form is:

Answer: D) 56700

$5.67 \times 10^4 = 5.67 \times 10000 = 56700$.

Q2(iii). Magnitude of the earthquake when $E = 10^4$ [4]

Answer: M = 100

$M = (3/2) \log_{10} E + 94$ with $E = 10^4$

$\log_{10} 10^4 = 4$

$M = (3/2)(4) + 94 = 6 + 94 = 100$

Paper 2

2025 · Model Paper · Curriculum 2022-23

Q1(ii) (MCQ). Scientific notation of 0.25^2:

Answer: C) 6.25×10^{-2}

$0.25^2 = 0.0625 = 6.25 \times 10^{-2}$.

Q2(iii). Year when population reaches 25,000 [4]

Answer: t ≈ 36.65 years, so about the year 2052

$P(t) = P_0 e^{rt}$, $P_0 = 10{,}000$, $r = 0.025$, $P = 25{,}000$

$25{,}000 = 10{,}000\ e^{0.025t} \rightarrow e^{0.025t} = 2.5$

Taking ln: $0.025t = \ln 2.5 = 0.9163 \rightarrow t = 0.9163 / 0.025 \approx 36.65$ years

2015 + 36.65 = 2051.65, so the population reaches 25,000 by about 2052.

Paper 3

2026 · 1st Exam · Set B

Q2 (MCQ). 4500 in scientific notation:

Answer: A) 4.5×10^3

$4500 = 4.5 \times 1000 = 4.5 \times 10^3$.

Q2(ii) OR. China (8.2) vs Pakistan (7.6) earthquake [4]

Answer: About 4 times stronger ($10^{0.6} \approx 3.98$)

$M = \log(I / I_o) \rightarrow I / I_o = 10^M$

$I(\text{China}) / I(\text{Pakistan}) = 10^{8.2} / 10^{7.6} = 10^{0.6} \approx 3.98 \approx 4$

Paper 4

2026 · 1st Exam · Set D

Q2 (MCQ). Scientific notation of 350:

Answer: B) 3.5×10^2

$350 = 3.5 \times 100 = 3.5 \times 10^2$.

Q2(iii). 1920 earthquake (8.5) vs 1923 earthquake (7.8) [4]

Answer: About 5 times stronger ($10^{0.7} \approx 5.01$)

Ratio $= 10^{8.5} / 10^{7.8} = 10^{8.5 - 7.8} = 10^{0.7} \approx 5.01 \approx 5$

Paper 5

2026 · 1st Exam · Set M

Q2 (MCQ). Scientific notation of 71000:

Answer: D) 7.1×10^4

$71000 = 7.1 \times 10000 = 7.1 \times 10^4$.

Q2(viii) OR. Years for 500 users to reach 3000 at 8% growth [4]

Answer: t ≈ 22.4 years

$N(t) = N_0 e^{rt}$: $3000 = 500\, e^{0.08t} \rightarrow e^{0.08t} = 6$

$0.08t = \ln 6 = 1.7918 \rightarrow t = 1.7918 / 0.08 \approx 22.40$ years

Paper 6

2026 · Model Paper · Inclusive Scheme 2024

Q2 (MCQ). Scientific notation of 150 million km:

Answer: B) 1.5×10^8

150 million = 150,000,000 = 1.5×10^8.

Q5 OR. Sound level L when intensity = 1000 I_0 [3]

Answer: L = 30

$L = 10 \log(I / I_0) = 10 \log(1000)$

$\log_{10} 1000 = 3 \rightarrow L = 10 \times 3 = 30$

Paper 7

2025 · Annual Paper · Old Curriculum 2006

Q3 (MCQ). Logarithm of unity to any base is:

Answer: D) 0

$\log_a 1 = 0$ because $a^0 = 1$.

Q2(iii). Find n: $\log_4 (64)^{n+1} = \log_5 (625)^{-1}$ [4]

Answer: n = −7/3

LHS = $(n + 1) \log_4 64 = 3(n + 1)$, since $4^3 = 64$

RHS = $-1 \times \log_5 625 = -4$, since $5^4 = 625$

$3(n + 1) = -4 \rightarrow 3n = -7 \rightarrow n = -7/3$

Q2(iii) OR. Find x: $\log_{81} 27 = x / 8$ [4]

Answer: x = 6

Let $\log_{81} 27 = y \rightarrow 81^y = 27 \rightarrow 3^{4y} = 3^3 \rightarrow y = 3/4$

$x / 8 = 3/4 \rightarrow x = 6$

Paper 8

2025 · Annual Paper · Set 1

Q2 (MCQ). Scientific notation of 345.6:

Answer: A) 3.456×10^2

345.6 = 3.456 × 100 = 3.456 × 10^2.

Q2(iii). $M = 200 \times 10^{-0.05t}$ [4]

Answer: (a) $t = -20 \log(M/200) = 20 \log(200/M)$ (b) t ≈ 6.02 years

(a) $M/200 = 10^{-0.05t}$; taking log: $\log(M/200) = -0.05t \rightarrow t = -20 \log(M/200) = 20 \log(200/M)$

(b) M = 100: t = 20 log(200/100) = 20 log 2 = 20 × 0.3010 ≈ 6.02 years

Paper 9

2025 · Annual Paper · Set 2

Q2 (MCQ). Scientific notation of 0.00567:

Answer: B) 5.67×10^{-3}

0.00567 = 5.67 / 1000 = 5.67 × 10^{-3}.

Q2(iii). $P = 2500\, e^{0.09t}$ [4]

Answer: (a) $t = (1/0.09) \ln(P/2500) \approx 11.11 \ln(P/2500)$ (b) t ≈ 15.40 years

(a) $P/2500 = e^{0.09t}$; taking ln: $\ln(P/2500) = 0.09t \rightarrow t = \ln(P/2500) / 0.09$

(b) P = 10,000: t = ln 4 / 0.09 = 1.3863 / 0.09 ≈ 15.40 years