MATHEMATICS MCQ BOOKLET

Grade 9 · Chapter 2 · Logarithms

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Independent MCQs on scientific notation, logarithms, characteristic and mantissa, antilogarithms, common versus natural logs, and log laws. Not copied from the book exercise. Total: 108 questions. Each item has four options, the correct letter, and a short explanation of why it is correct.

A. Important / Main Topics

1. A number c is in scientific notation when it is written as d × 10^n with n an integer and:

(A) 1 ≤ d < 10
(B) 0 < d < 1
(C) d ≥ 10
(D) d = 10 always

Correct Answer: A

Explanation: The leading factor must have exactly one non-zero digit to the left of the decimal.

2. 0.00072 in scientific notation is:

(A) 7.2 × 10^{−3}
(B) 7.2 × 10^{−4}
(C) 72 × 10^{−5}
(D) 0.72 × 10^{−3}

Correct Answer: B

Explanation: Move the decimal four places right: 7.2, so the power is −4.

3. 720 000 in scientific notation is:

(A) 7.2 × 10^4
(B) 72 × 10^4
(C) 7.2 × 10^5
(D) 7.2 × 10^6

Correct Answer: C

Explanation: 720 000 in scientific notation is 7.2 × 10^5.

4. 4.08 already has one digit left of the decimal, so in scientific notation it is:

(A) 4.08 × 10^1
(B) 40.8 × 10^{−1}
(C) 0.408 × 10^1
(D) 4.08 × 10^0

Correct Answer: D

Explanation: Any d with 1 ≤ d < 10 is written as d × 10^0.

5. 0.00302 in scientific notation is:

(A) 3.02 × 10^{−3}
(B) 3.02 × 10^{−2}
(C) 3.02 × 10^{−4}
(D) 30.2 × 10^{−4}

Correct Answer: A

Explanation: 0.00302 in scientific notation is 3.02 × 10^{−3}.

6. 5.1 × 10^{−4} in standard (ordinary) notation is:

(A) 0.0051
(B) 0.00051
(C) 51 000

(D) 0.051

Correct Answer: B

Explanation: 5.1 × 10^{−4} in standard (ordinary) notation is 0.00051.

7. 3.7 × 10^5 in standard notation is:

(A) 3700
(B) 37 000
(C) 370 000
(D) 3 700 000

Correct Answer: C

Explanation: 3.7 × 10^5 in standard notation is 370 000.

8. If the original number is greater than 10, the exponent n in scientific notation is:

(A) zero
(B) negative
(C) always 1
(D) positive

Correct Answer: D

Explanation: The decimal must move left, which is recorded as a positive power of 10.

9. If the original number is smaller than 1, the exponent n is:

(A) negative
(B) positive
(C) always 0
(D) always 10

Correct Answer: A

Explanation: The decimal must move right, recorded as a negative power of 10.

10. (2.0 × 10^3) × (4.0 × 10^2) in scientific notation is:

(A) 8.0 × 10^6
(B) 8.0 × 10^5
(C) 6.0 × 10^5
(D) 8.0 × 10^1

Correct Answer: B

Explanation: 2 × 4 = 8 and 10^{3+2} = 10^5, so the correct choice is 8.0 × 10^5.

11. (9.0 × 10^6) / (3.0 × 10^2) equals:

(A) 3.0 × 10^3
(B) 6.0 × 10^4
(C) 3.0 × 10^4
(D) 3.0 × 10^8

Correct Answer: C

Explanation: 9/3 = 3 and 10^{6−2} = 10^4, so the correct choice is 3.0 × 10^4.

12. Light travelling 1.5 × 10^8 km at 3.0 × 10^5 km/s takes:

(A) 50 s
(B) 5 s
(C) 5000 s
(D) 500 s

Correct Answer: D

Explanation: Light travelling 1.5 × 10^8 km at 3.0 × 10^5 km/s takes 500 s.

13. If b^y = x with b > 0, b ≠ 1 and x > 0, then y equals:

(A) log_b x
(B) log_x b
(C) x^b

(D) b/x

Correct Answer: A

Explanation: The logarithm is defined as the exponent that produces x from base b.

14. 2^5 = 32 is equivalent to:

(A) log_2 5 = 32
(B) log_2 32 = 5
(C) log_32 2 = 5
(D) log_5 32 = 2

Correct Answer: B

Explanation: 2^5 = 32 is equivalent to log_2 32 = 5.

15. log_3 81 = 4 because:

(A) 3 + 81 = 4
(B) 81/3 = 4
(C) 3^4 = 81
(D) 4^3 = 81

Correct Answer: C

Explanation: Three to the fourth power is 81, so the log base 3 of 81 is 4.

16. log_2 (1/16) equals:

(A) 4
(B) 1/4
(C) 16
(D) −4

Correct Answer: D

Explanation: 2^{−4} = 1/16, so the logarithm is −4, so the correct choice is −4.

17. log_5 625 equals:

(A) 4
(B) 3
(C) 5
(D) 25

Correct Answer: A

Explanation: 5^4 = 625, so the correct choice is 4.

18. log_8 2 equals:

(A) 3
(B) 1/3
(C) 4
(D) −3

Correct Answer: B

Explanation: 8^{1/3} = 2, so the log is 1/3, so the correct choice is 1/3.

19. log_9 27 equals:

(A) 3
(B) 2
(C) 3/2
(D) 1/2

Correct Answer: C

Explanation: 9^{3/2} = (3^2)^{3/2} = 3^3 = 27, so the correct choice is 3/2.

20. log_25 5 equals:

(A) 2
(B) 5
(C) 25

(D) 1/2

Correct Answer: D

Explanation: 25^{1/2} = 5, so the correct choice is 1/2.

21. log_b 1 equals:

(A) 0
(B) 1
(C) b
(D) undefined always

Correct Answer: A

Explanation: Any allowed base to the power 0 is 1, so the correct choice is 0.

22. log_b b equals:

(A) 0
(B) 1
(C) b
(D) −1

Correct Answer: B

Explanation: b^1 = b, so the log of the base is 1, so the correct choice is 1.

23. log_a (a^x) equals:

(A) a
(B) 1
(C) x
(D) 0

Correct Answer: C

Explanation: The log undoes the exponential with the same base.

24. log_1 8 is:

(A) 8
(B) 0
(C) 1
(D) undefined

Correct Answer: D

Explanation: Base 1 is forbidden: 1 to any power stays 1, never 8.

25. log_5 (−1) is:

(A) undefined in the reals
(B) −1
(C) 0
(D) 1

Correct Answer: A

Explanation: A positive base never yields a negative, so the log of a negative is not real.

26. log_2 0 is:

(A) 0
(B) undefined
(C) 1
(D) −∞ written as 0 in tables

Correct Answer: B

Explanation: No real exponent of 2 produces 0, so the correct choice is undefined.

27. If log_2 x = 5, then x equals:

(A) 10
(B) 25
(C) 32

(D) 64

Correct Answer: C

Explanation: x = 2^5 = 32, so the correct choice is 32.

28. If log_64 x = −2/3, then x equals:

(A) 16
(B) 8
(C) 1/8
(D) 1/16

Correct Answer: D

Explanation: If log_64 x = −2/3, then x equals 1/16.

29. If log_b (1/32) = −5, then b equals:

(A) 2
(B) 5
(C) 32
(D) 1/2

Correct Answer: A

Explanation: b^{−5} = 2^{−5} forces b = 2, so the correct choice is 2.

30. If log_27 3 = y, then y equals:

(A) 3
(B) 1/3
(C) 9
(D) −3

Correct Answer: B

Explanation: 27^y = 3 □ (3^3)^y = 3^1 □ 3y = 1, so the correct choice is 1/3.

31. If log_b (y^3 + 1) = log_b 28 and logs are defined, then y equals:

(A) 9
(B) 27
(C) 3
(D) 28

Correct Answer: C

Explanation: One-to-one: y^3 + 1 = 28 so y^3 = 27 and y = 3.

32. Common logarithms (Briggs) use base:

(A) e
(B) 2
(C) 1
(D) 10

Correct Answer: D

Explanation: log x with no base written means log_10 x.

33. Natural (Naperian) logarithms use base e, which is:

(A) an irrational near 2.71828
(B) exactly 22/7
(C) exactly 10
(D) exactly 2

Correct Answer: A

Explanation: e is transcendental; school value is about 2.71828.

34. ln x is another way to write:

(A) log_10 x
(B) log_e x
(C) log_2 x

(D) antilog x

Correct Answer: B

Explanation: ln x is another way to write log_e x.

35. A logarithm equals characteristic plus mantissa, where the characteristic is the:

(A) fractional part
(B) always positive decimal
(C) integral part
(D) table difference only

Correct Answer: C

Explanation: The characteristic is the integer piece; the mantissa is the decimal piece.

36. The characteristic of log(4.37 × 10^3) is:

(A) 4
(B) 0.437
(C) −3
(D) 3

Correct Answer: D

Explanation: In scientific form d × 10^n the characteristic is n.

37. The characteristic of log(6.02 × 10^{−4}) is:

(A) −4, written bar 4
(B) 4
(C) 6
(D) 0

Correct Answer: A

Explanation: The power of 10 is −4, recorded as a barred 4 so the mantissa can stay positive.

38. For a whole number, the number of digits equals:

(A) the characteristic
(B) characteristic + 1
(C) the mantissa
(D) 10^n

Correct Answer: B

Explanation: A 4-digit integer such as 1009 has characteristic 3.

39. The mantissa of a common log is always:

(A) negative
(B) an integer ≥ 1
(C) a number m with 0 ≤ m < 1
(D) greater than 10

Correct Answer: C

Explanation: The mantissa of a common log is always a number m with 0 ≤ m < 1.

40. log 0.012 written as characteristic plus mantissa uses characteristic:

(A) 2
(B) bar 1
(C) 0
(D) bar 2

Correct Answer: D

Explanation: 0.012 = 1.2 × 10^{−2}, so the characteristic is −2.

41. One must not rewrite bar 2.0899 as −2.0899 because that would make the:

(A) mantissa negative as well
(B) characteristic positive
(C) base equal to e

(D) antilog undefined

Correct Answer: A

Explanation: One must not rewrite bar 2.0899 as −2.0899 because that would make the mantissa negative as well.

42. If 1 < x < 10, then log_10 x lies in:

(A) (1, 10)
(B) (0, 1)
(C) (−1, 0)
(D) [10, ∞)

Correct Answer: B

Explanation: log 1 = 0 and log 10 = 1, so numbers in between have logs between 0 and 1.

43. log 10 equals:

(A) 0
(B) 10
(C) 1
(D) e

Correct Answer: C

Explanation: 10^1 = 10, so the correct choice is 1.

44. log 0.001 equals:

(A) 3
(B) 1/3
(C) 0.001
(D) −3

Correct Answer: D

Explanation: 10^{−3} = 0.001, so the correct choice is −3.

45. If log x = y, then x is called the:

(A) antilog of y
(B) mantissa of y
(C) characteristic of y only
(D) base of y

Correct Answer: A

Explanation: If log x = y, then x is called the antilog of y.

46. When reading an antilog table one uses the:

(A) characteristic only
(B) mantissa, then places the decimal with the characteristic
(C) base e always
(D) Richter magnitude

Correct Answer: B

Explanation: Digits come from the mantissa; the characteristic only locates the decimal point.

47. antilog 2 equals:

(A) 2
(B) 20
(C) 100
(D) 0.01

Correct Answer: C

Explanation: 10^2 = 100, so the correct choice is 100.

48. antilog 0 equals:

(A) 0
(B) 10
(C) undefined

(D) 1

Correct Answer: D

Explanation: 10^0 = 1, so the correct choice is 1.

49. antilog(bar 1.0000) equals:

(A) 0.1
(B) 10
(C) 1
(D) −10

Correct Answer: A

Explanation: Characteristic −1 with mantissa 0 is 10^{−1} = 0.1.

50. The product law of logarithms is:

(A) log(mn) = log m · log n
(B) log(mn) = log m + log n
(C) log(mn) = log m − log n
(D) log(m + n) = log m + log n

Correct Answer: B

Explanation: A product inside a log becomes a sum of logs (when defined).

51. The quotient law of logarithms is:

(A) log(m/n) = log m / log n
(B) log(m/n) = log(m − n)
(C) log(m/n) = log m − log n
(D) log(m/n) = n log m

Correct Answer: C

Explanation: The quotient law of logarithms is log(m/n) = log m − log n.

52. The power law of logarithms is:

(A) log(m^n) = (log m)^n
(B) log(m^n) = log m + n
(C) log(m^n) = m log n
(D) log(m^n) = n log m

Correct Answer: D

Explanation: An exponent on the argument comes out as a coefficient.

53. log 8 + log 2 (same base) equals:

(A) log 16
(B) log 10
(C) log 6
(D) log 4

Correct Answer: A

Explanation: 8 × 2 = 16, so the sum is log 16, so the correct choice is log 16.

54. log 72 − log 8 equals:

(A) log 64
(B) log 9
(C) log 80
(D) log 576

Correct Answer: B

Explanation: 72/8 = 9, so the correct choice is log 9.

55. 2 log 5 equals:

(A) log 7
(B) log 10
(C) log 25

(D) log 32

Correct Answer: C

Explanation: 2 log 5 = log(5²) = log 25, so the correct choice is log 25.

56. 3 log 2 + log 5 equals:

(A) log 30
(B) log 15
(C) log 8
(D) log 40

Correct Answer: D

Explanation: log(2³ · 5) = log 40, so the correct choice is log 40.

57. log(50 − 5) compared with log 50 − log 5 is:

(A) not equal in general
(B) always equal
(C) equal only if logs are natural
(D) equal only base 2

Correct Answer: A

Explanation: The log of a difference is not the difference of logs.

58. Change of base: log_b m equals:

(A) log_a m · log_a b
(B) log_a m / log_a b
(C) log_a (m/b)
(D) m / b

Correct Answer: B

Explanation: Divide logs that share a convenient base a (often 10 or e).

59. log_2 8 by change of base to 10 is:

(A) log 2 / log 8
(B) 8/2
(C) log 8 / log 2 which equals 3
(D) log(8 − 2)

Correct Answer: C

Explanation: log 8 / log 2 = 0.9030/0.3010 = 3, so the correct choice is log 8 / log 2 which equals 3.

60. The identity log_b a · log_a b equals:

(A) 0
(B) ab
(C) a + b
(D) 1

Correct Answer: D

Explanation: Each factor is the reciprocal of the other.

61. log_c a equals:

(A) 1 / log_a c
(B) log_a c
(C) log_a 1
(D) c/a

Correct Answer: A

Explanation: This is the reciprocal form of change of base.

62. The cyclic product log_b a · log_c b · log_a c equals:

(A) 0
(B) 1
(C) abc

(D) a + b + c

Correct Answer: B

Explanation: The cyclic product log_b a · log_c b · log_a c equals 1.

63. Using log 2 ≈ 0.3010 and log 3 ≈ 0.4771, log 6 equals:

(A) 0.1761
(B) 0.9030
(C) 0.7781
(D) 1.4771

Correct Answer: C

Explanation: Using log 2 ≈ 0.3010 and log 3 ≈ 0.4771, log 6 equals 0.7781.

64. Using log 2 ≈ 0.3010, log 3 ≈ 0.4771, log 5 ≈ 0.6990, log 30 equals:

(A) 1.1761
(B) 0.8451
(C) 2.0000
(D) 1.4771

Correct Answer: D

Explanation: 30 = 2·3·5, so 0.3010 + 0.4771 + 0.6990 = 1.4771.

65. Using log 2 ≈ 0.3010, log 8 equals:

(A) 0.9030
(B) 0.6020
(C) 2.4080
(D) 0.3010

Correct Answer: A

Explanation: 8 = 2^3 so 3 × 0.3010 = 0.9030, so the correct choice is 0.9030.

66. Using log 2 ≈ 0.3010 and log 3 ≈ 0.4771, log 12 equals:

(A) 0.7781
(B) 1.0791
(C) 0.1761
(D) 1.5561

Correct Answer: B

Explanation: 12 = 4·3 = 2^2·3 so 0.6020 + 0.4771 = 1.0791.

67. Using log 3 ≈ 0.4771 and log 5 ≈ 0.6990, log 15 equals:

(A) 0.2219
(B) 0.6990
(C) 1.1761
(D) 3.3161

Correct Answer: C

Explanation: 15 = 3·5 so 0.4771 + 0.6990 = 1.1761, so the correct choice is 1.1761.

68. log(1/2) using log 2 ≈ 0.3010 equals:

(A) 0.3010
(B) 2.3010
(C) 1.3010
(D) −0.3010

Correct Answer: D

Explanation: log(1/2) = − log 2 = −0.3010, so the correct choice is −0.3010.

69. The Richter magnitude is M = log(I / I_0), so it is a:

(A) common-log scale in intensity
(B) linear scale in I
(C) natural-log of time only

(D) base-2 count of aftershocks

Correct Answer: A

Explanation: Each step in M is a power-of-ten change in I.

70. If two earthquakes differ by 1.0 on the Richter scale, the intensity ratio is about:

(A) 2
(B) 10
(C) 100
(D) 0.1

Correct Answer: B

Explanation: antilog(1) = 10, so one magnitude step is a tenfold intensity jump.

71. If two earthquakes differ by 2.0 on the Richter scale, the intensity ratio is about:

(A) 2
(B) 20
(C) 100
(D) 4

Correct Answer: C

Explanation: 10^2 = 100, so the correct choice is 100.

72. If log(I_2 / I_1) = 0.6, then I_2 / I_1 is about:

(A) 0.6
(B) 6
(C) 60
(D) 4

Correct Answer: D

Explanation: If log(I_2 / I_1) = 0.6, then I_2 / I_1 is about 4.

73. Laws of logs turn a product into:

(A) a sum of logs
(B) a quotient of logs
(C) an exponent of logs
(D) a difference of bases

Correct Answer: A

Explanation: That is why lengthy multiplications become additions.

74. Laws of logs turn a quotient into:

(A) a product of logs
(B) a difference of logs
(C) a sum of bases
(D) an antilog of 0

Correct Answer: B

Explanation: Laws of logs turn a quotient into a difference of logs.

75. Laws of logs turn a power or root into:

(A) an impossible operation
(B) addition of the base
(C) multiplication of a coefficient times a log
(D) a change of mantissa only

Correct Answer: C

Explanation: Laws of logs turn a power or root into multiplication of a coefficient times a log.

76. log_√10 (100) equals:

(A) 1
(B) 2
(C) 10

(D) 4

Correct Answer: D

Explanation: √10 = 10^{1/2} and 100 = 10^2, so the log is 2 / (1/2) = 4.

77. log_√10 (100²) equals:

(A) 8
(B) 4
(C) 2
(D) 1

Correct Answer: A

Explanation: log_√10 (100²) equals 8.

78. 5 log 2 − 2 log 5 equals:

(A) (log 2)^5 / (log 5)^2
(B) log(2^5 / 5^2)
(C) (5/2) log(2/5)
(D) log 2 − log 5

Correct Answer: B

Explanation: 5 log 2 − 2 log 5 equals log(2^5 / 5^2).

79. If log_√x 25 = 4 with x > 0, x ≠ 1, then x equals:

(A) 25
(B) 625
(C) 5
(D) undefined

Correct Answer: C

Explanation: (√x)^4 = 25 □ (x^{1/2})^4 = x² = 25 □ x = 5 (x = −5 is not allowed as a log base).

80. Which of log 1, log 0, log(−2), log_{−2} 2 is defined as a real common log?

(A) log 0
(B) log(−2)
(C) log_{−2} 2
(D) log 1

Correct Answer: D

Explanation: log 1 = 0; zero, negatives, and negative bases are not allowed in the real common log.

B. Less Important / Secondary Topics

81. Al-Khwarizmi's name is historically linked to the word:

(A) logarithm
(B) geometry
(C) mantissa
(D) Richter

Correct Answer: A

Explanation: Al-Khwarizmi's name is historically linked to the word logarithm.

82. John Napier in the late 1500s extended earlier work by starting:

(A) Hindu-Arabic digits
(B) log tables
(C) Roman numerals
(D) set theory

Correct Answer: B

Explanation: John Napier in the late 1500s extended earlier work by starting log tables.

83. Henry Briggs is associated with:

(A) base-e logs only

(B) the empty set
(C) common (base-10) logarithms
(D) Mayan zero

Correct Answer: C

Explanation: Henry Briggs is associated with common (base-10) logarithms.

84. In an integer, the decimal point is understood to sit:

(A) before the first digit
(B) in the middle always
(C) nowhere
(D) to the right of the last digit

Correct Answer: D

Explanation: 543 means 543.0 when counting places for scientific notation.

85. 6.25 in scientific notation is:

(A) 6.25 × 10^0
(B) 6.25 × 10^1
(C) 0.625 × 10^2
(D) 62.5 × 10^{−1}

Correct Answer: A

Explanation: The coefficient already satisfies $1 \le d < 10$, so the power is 0.

86. Exponential models (and thus logs) appear when scientists estimate:

(A) only Roman dates
(B) ages of fossils or half-lives of radioisotopes
(C) only tally marks
(D) only set unions

Correct Answer: B

Explanation: Growth and decay invert as logarithms, so the correct choice is ages of fossils or half-lives of radioisotopes.

87. ln 1 equals:

(A) 1
(B) e
(C) 0
(D) undefined

Correct Answer: C

Explanation: e^0 = 1, so the natural log of 1 is 0, so the correct choice is 0.

88. ln e equals:

(A) 0
(B) e
(C) 10
(D) 1

Correct Answer: D

Explanation: e^1 = e, so the correct choice is 1.

89. ln(e^3) equals:

(A) 3
(B) e^3
(C) ln 3
(D) 1/3

Correct Answer: A

Explanation: The natural log undoes the exponential, so the correct choice is 3.

90. If log x_1 = log x_2 (same base, arguments positive), then:

(A) $x_1 + x_2 = 0$
(B) $x_1 = x_2$
(C) $x_1 = 1/x_2$
(D) $x_1 = 10$

Correct Answer: B

Explanation: Logs with a fixed base are one-to-one on $(0, \infty)$.

91. log 100 equals:

(A) 1
(B) 10
(C) 2
(D) 0

Correct Answer: C

Explanation: $10^2 = 100$, so the correct choice is 2.

92. A 3-digit whole number has characteristic:

(A) 3
(B) 1
(C) 0
(D) 2

Correct Answer: D

Explanation: Digits = characteristic + 1, so $3 = n + 1$ gives $n = 2$.

93. The characteristic of log 0.00327 is:

(A) bar 3
(B) 3
(C) bar 2
(D) 0.327

Correct Answer: A

Explanation: $0.00327 = 3.27 \times 10^{-3}$, so the correct choice is bar 3.

94. Slide rules historically performed hard arithmetic by using:

(A) set Venn diagrams
(B) logarithmic scales
(C) Roman numerals only
(D) tally bones

Correct Answer: B

Explanation: Slide rules historically performed hard arithmetic by using logarithmic scales.

95. Do not confuse $\log_a m / \log_a n$ with:

(A) change of base toward $\log_n m$
(B) the power law
(C) the quotient law $\log(m/n)$
(D) antilog

Correct Answer: C

Explanation: A ratio of logs is change of base; the quotient law has one log of a fraction.

96. $\log_b (M + N)$ equals:

(A) $\log_b M + \log_b N$ always
(B) $\log_b (MN)$
(C) $N \log_b M$
(D) not in general equal to $\log_b M + \log_b N$

Correct Answer: D

Explanation: $\log_b (M + N)$ equals not in general equal to $\log_b M + \log_b N$.

97. $\log_7 7^{-3} + \log_2 4^3$ equals:

(A) 3
(B) 0
(C) 6
(D) 9

Correct Answer: A

Explanation: log_7 7^{−3} = −3 and log_2 (4^3) = 3 · log_2 4 = 3 · 2 = 6, so −3 + 6 = 3.

98. log_2 4 − log_3 1 equals:

(A) 0
(B) 2
(C) 1
(D) 4

Correct Answer: B

Explanation: log_2 4 = 2 and log_3 1 = 0, so the difference is 2.

99. log_3 9 − log_b 1 equals:

(A) 0
(B) 3
(C) 2
(D) 1

Correct Answer: C

Explanation: log_3 9 = 2 and any log of 1 is 0, so the correct choice is 2.

100. If log_2 x − log_2 (16^{1/4}) = 3, then x equals:

(A) 4
(B) 8
(C) 32
(D) 16

Correct Answer: D

Explanation: 16^{1/4} = 2, so log_2 (x/2) = 3 □ x/2 = 8 □ x = 16.

101. If log_2 (x² − 1) = log_2 3, then a valid real solution is:

(A) x = 2
(B) x = 0
(C) x = 1
(D) x = −1

Correct Answer: A

Explanation: x² − 1 = 3 □ x² = 4 □ x = ±2; both give positive arguments. 2 is listed.

102. The base of a natural logarithm is:

(A) rational
(B) irrational
(C) an integer 10
(D) always 2

Correct Answer: B

Explanation: e is irrational (in fact transcendental).

103. log_√3 (√3) equals:

(A) 0
(B) 3
(C) 1
(D) 1/2

Correct Answer: C

Explanation: Log of the base is 1, so the correct choice is 1.

104. log_√7 343 equals:

(A) 2
(B) 3
(C) 7
(D) 6

Correct Answer: D

Explanation: 343 = 7^3 = (√7)^6, so the log is 6, so the correct choice is 6.

105. (4.0 × 10^{−2}) × (2.0 × 10^5) in scientific notation is:

(A) 8.0 × 10^3
(B) 8.0 × 10^2
(C) 6.0 × 10^3
(D) 8.0 × 10^{−10}

Correct Answer: A

Explanation: 8.0 × 10^{−2+5} = 8.0 × 10^3, so the correct choice is 8.0 × 10^3.

106. 9.067 × 10^{−5} in standard notation is:

(A) 0.0009067
(B) 0.00009067
(C) 90 670
(D) 0.009067

Correct Answer: B

Explanation: Five places left from 9.067, so the correct choice is 0.00009067.

107. log_8 (log_x x − log_b b^{−7}), when defined, equals:

(A) 8
(B) −6
(C) 1
(D) 0

Correct Answer: C

Explanation: log_x x = 1 and log_b b^{−7} = −7, so the inside is 1 − (−7) = 8, and log_8 8 = 1.

108. A logarithm is essentially an:

(A) angle
(B) area
(C) ordered pair
(D) exponent

Correct Answer: D

Explanation: y = log_b x means b^y = x, so y is the exponent.