ExamPath

CLASS 9 MATHEMATICS · FBISE · UNIT 2

Unit 2: Logarithms — Exam Ready

25 multiple-choice questions Suggested time: **25 minutes** 1 mark each

Name: Date: Score: / 25

Circle one answer for each question. The answer key with explanations is on the last pages, so try every question before you check. These are practice questions, not official FBISE papers.

1. Which base lets a calculator find $\log_7 20$, using the change of base law?

(A) Only base 20
(B) Any valid base, such as 10 or e
(C) Only base 2
(D) Only base 7

2. Which pair of expressions is equal?

(A) $\log_3 4$ and $4 \log 3$
(B) $\log_3 4$ and $\log 4 \div \log 3$
(C) $\log_3 4$ and $\log(4/3)$
(D) $\log_3 4$ and $\log 4 - \log 3$

3. The number of digits in a whole number is equal to:

(A) its characteristic
(B) its characteristic − 1
(C) its characteristic + 1
(D) its mantissa

4. If $\log x = y$, then x is called the:

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

5. The base e of natural logarithms is approximately:

(A) 3.142
(B) 10
(C) 2.718
(D) 1.414

6. If $\log 2 = 0.3010$, how many digits does 2^{20} have?

(A) 6
(B) 7
(C) 20
(D) 8

7. Write $5 \log 2 - 2 \log 5$ as a single logarithm.

(A) $\log(25/32)$
(B) $\log 3$
(C) $\log(32/25)$
(D) $\log 7$

8. Why is $\log_b b = 1$ for every valid base b?

(A) Because a logarithm is a fraction
(B) Because b is always 10
(C) Because $b^0 = 1$
(D) Because $b^1 = b$

9. Which logarithm is defined?

(A) $\log_0 4$
(B) $\log_4 0$
(C) $\log_4(-16)$
(D) $\log_4 16$

10. What is the value of $\log_b b$?

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

11. For which value of x is $\log_2(4 - 2x)$ undefined?

(A) $x = 1$
(B) $x = 0$
(C) $x = 2$
(D) $x = -1$

12. Which statement is correct (all logarithms defined)?

(A) $\log(mn) = \log m \times \log n$
(B) $\log(m + n) = \log m \times \log n$
(C) $\log(m + n) = \log m + \log n$
(D) $\log(mn) = \log m + \log n$

13. Common logarithms (base 10) are also called:

(A) Naperian logarithms
(B) binary logarithms
(C) Briggs's logarithms
(D) natural logarithms

14. If $\log_b 8 = 3$, what is b?

(A) 8/3
(B) 2
(C) 3
(D) 24

15. Which logarithm has a negative characteristic?

(A) log 0.04
(B) log 100
(C) log 25
(D) log 7.5

16. Which number is NOT in scientific notation?

(A) 7.412×10^{-2}
(B) 3.2×10^{-4}
(C) 1.592×10^{0}
(D) 12.5×10^{3}

17. Which statement about $\log_3 10$ is correct?

(A) It is between 1 and 2
(B) It is between 2 and 3
(C) It is between 3 and 4
(D) It equals 10/3

18. Evaluate $\log_9 3$.

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

19. $\log_b(m \div n)$ equals:

(A) $\log_b m - \log_b n$
(B) $\log_b m + \log_b n$
(C) $\log_b n - \log_b m$
(D) $\log_b m \div \log_b n$

20. On the Richter scale $M = \log(I \div I_0)$. An earthquake whose intensity equals I_0 has magnitude:

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

21. Evaluate $\log_2 3 \times \log_3 4$.

(A) 2
(B) 7
(C) 12
(D) 1

22. One earthquake measures 7 and another 5 on the Richter scale. How many times stronger is the first?

(A) 100
(B) 10
(C) 2
(D) 1000

23. Which statement is equivalent to $7^{-2} = 1/49$?

(A) $\log_7 49 = -2$
(B) $\log_7(1/49) = -2$
(C) $\log_{-2} 7 = 1/49$
(D) $\log_{49} 7 = -2$

24. Which statement about the antilogarithm is correct?

(A) It is the inverse operation of taking the logarithm
(B) It is the square of a logarithm
(C) It is the mantissa of a number
(D) It is the same as the characteristic

25. The power law of logarithms states:

(A) $\log_b m^n = \log_b m + n$
(B) $\log_b m^n = m \log_b n$
(C) $\log_b m^n = (\log_b m)^n$
(D) $\log_b m^n = n \log_b m$

Answer key

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1 B	**2** B	**3** C	**4** A	**5** C
6 B	**7** C	**8** D	**9** D	**10** C
11 C	**12** D	**13** C	**14** B	**15** A
16 D	**17** B	**18** A	**19** A	**20** D
21 A	**22** A	**23** B	**24** A	**25** D

Explanations

1. B. Any valid base, such as 10 or e
$\log_7 20 = \log 20 \div \log 7$, using base 10 or ln for both. Any valid new base gives the same ratio.

2. B. $\log_3 4$ and $\log 4 \div \log 3$
Change of base: $\log_3 4 = \log 4 \div \log 3$. The other pairs use laws that do not apply.

3. C. its characteristic + 1
For example, 1009 has characteristic 3 and 4 digits.

4. A. antilog of y
Antilog is the inverse operation of taking the logarithm: x = antilog y.

5. C. 2.718
e ≈ 2.71828 and it is irrational.

6. B. 7
$\log 2^{20} = 20 \times 0.3010 = 6.020$. The characteristic is 6, so the number has 6 + 1 = 7 digits.

7. C. log(32/25)
5 log 2 = log 32 and 2 log 5 = log 25. The difference is log(32/25).

8. D. Because $b^1 = b$
The exponent that turns b into b is 1.

9. D. $\log_4 16$
$\log_4 16 = 2$. A negative number, 0 and the base 0 are not allowed.

10. C. 1
$b^1 = b$, so $\log_b b = 1$.

11. C. x = 2
At x = 2 the bracket becomes 0, and the logarithm of 0 is undefined. The other values give 4, 2 and 6.

12. D. log(mn) = log m + log n
Only the product law holds. A sum inside a logarithm cannot be split.

13. C. Briggs's logarithms
Base 10 logarithms are named after Henry Briggs. Naperian logarithms use base e.

14. B. 2
$b^3 = 8$, so b = 2.

15. A. log 0.04
$0.04 = 4 \times 10^{-2}$, so its characteristic is −2. The numbers 25, 100 and 7.5 give 1, 2 and 0.

16. **D. 12.5×10^3**
The coefficient 12.5 is not between 1 and 10. It should be written 1.25×10^4.

17. **B. It is between 2 and 3**
$3^2 = 9$ and $3^3 = 27$, and 10 lies between them. So the logarithm is between 2 and 3.

18. **A. 1/2**
$9^{1/2} = 3$, so $\log_9 3 = 1/2$.

19. **A. $\log_b m - \log_b n$**
The logarithm of a quotient is the difference of the logarithms.

20. **D. 0**
$I \div I_0 = 1$, and $\log 1 = 0$.

21. **A. 2**
Change of base: $(\log 3 \div \log 2) \times (\log 4 \div \log 3) = \log 4 \div \log 2 = \log_2 4 = 2$.

22. **A. 100**
The difference is 2, so the intensity ratio is $10^2 = 100$.

23. **B. $\log_7(1/49) = -2$**
The base is 7, the exponent −2 is the logarithm, and the number is 1/49.

24. **A. It is the inverse operation of taking the logarithm**
If $\log x = y$, then $x = \text{antilog } y$. It undoes the effect of the logarithm.

25. **D. $\log_b m^n = n \log_b m$**
The exponent comes out in front as a multiplier.

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