

Brett Robbins Academic Consulting

Math 30-1 Practice Test

Exponential & Logarithmic Functions

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

The logarithmic form of the equation $4^{3/2} = 8$ is

A) $\log_4 8 = \frac{3}{2}$

B) $\log_8 4 = \frac{3}{2}$

C) $\log_4 \frac{3}{2} = 8$

D) $\log_8 \frac{3}{2} = 4$

Question 2

The value of $\log_5 \left(\frac{1}{125} \right)$ is

A) 3

B) -3

C) $-\frac{1}{3}$

D) $\frac{1}{3}$

Question 3

The expression $\log_5 \left(\frac{25a^2}{b} \right)$, where $a, b > 0$, expanded fully, is

A) $25 + 2\log_5 a - \log_5 b$

B) $2 + 2\log_5 a - \log_5 b$

C) $2 + \log_5 a - \log_5 b$

D) $2 + 2\log_5 a + \log_5 b$

Question 4

The solution to the equation $3^{x+1} = 27^{x-2}$ is

A) $\frac{5}{2}$

B) 3

C) $\frac{7}{2}$

D) $-\frac{5}{2}$

Question 5

The equation of the horizontal asymptote of the graph of $y = 2^{x-3} + 1$ is

- A) $y = 1$
B) $y = 3$
C) $y = 0$
D) $x = 3$

Question 6

The expression $\log x + 2\log y - \frac{1}{3}\log z$, where $x, y, z > 0$, written as a single logarithm, is

- A) $\log\left(\frac{2xy}{3z}\right)$
 B) $\log(xy^2z^{1/3})$
 C) $\log\left(\frac{xy^2}{z^3}\right)$
 D) $\log\left(\frac{xy^2}{z^{1/3}}\right)$

Question 7

The value of $\frac{\log_4 9}{\log_4 3}$ is

- A) 3
B) 2
C) 6
D) $\frac{1}{2}$

Question 8

The solution to the equation $\log_2 x + \log_2 (x - 2) = 3$ is

- A) $x = -2$
B) $x = 4$ and $x = -2$
C) $x = 4$
D) $x = 8$

Question 9

A culture of bacteria starts with 500 bacteria and doubles every 3 hours.

The number of bacteria after 15 hours is

- A) 16 000 B) 8 000
C) 2 500 D) 32 000

Question 10

The equation of the vertical asymptote of the graph of $y = \log_5(x + 2) - 1$ is

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

Question 11

If $\log_2 3 = a$ and $\log_2 5 = b$, then $\log_2 \left(\frac{45}{8}\right)$ expressed in terms of a and b is

- A) $2a + b - 3$
B) $2a + b + 3$
C) $a + 2b - 3$
D) $ab - 3$

Question 12

If $\log_5 (3x - 2) = 2$, then the value of x is

Question 13

A sample of a radioactive substance has an initial mass of 80 mg

and a half-life of 6 days. The mass, in milligrams, remaining after 24 days is

Question 14

An earthquake with a magnitude of 7.4 on the Richter scale is how many times more intense than an earthquake with a magnitude of 5.4?

- A) 2
- B) 20
- C) 100
- D) 1 000

Question 15

The solutions to the equation $2^{2x} - 9(2^x) + 8 = 0$ are

- A) $x = 1$ and $x = 8$
- B) $x = 0$ and $x = 3$
- C) $x = 3$ only
- D) $x = 0$ and $x = 8$

Question 16

An investment earns interest at a rate of 6% per year, compounded annually.

The number of years, to the nearest tenth, that it takes for the investment to double in value is

Question 17

A solution has a hydronium ion concentration of 3.2×10^{-5} mol/L.

The pH of the solution, to the nearest tenth, is

- A) 3.5
- B) 5.5
- C) -4.5
- D) 4.5

Question 18

The graph of $y = \log_2 x$ is transformed to the graph of $y = -\log_2 (x - 1) + 3$.

The x -intercept of the transformed graph is

Question 19

The value of $\log_8 32$, to the nearest tenth, is

Question 20

The loudness of a sound, in decibels, is given by $L = 10 \log \left(\frac{I}{10^{-12}} \right)$,

where I is the intensity of the sound in W/m^2 .

The loudness of a sound with an intensity of 10^{-3} W/m^2 is

- | | |
|----------|-----------|
| A) 90 dB | B) 30 dB |
| C) 9 dB | D) 120 dB |

Question 21

The domain of the function $y = \log_3 (2x - 8)$ is

- | | |
|---------------|------------|
| A) $x \geq 4$ | B) $x > 4$ |
| C) $x > -4$ | D) $x < 4$ |

Question 22

If $\log_2 x + \log_2 (x - 6) = 4$, then the value of x is

Question 23

Carbon – 14 has a half – life of 5 730 years. A fossil contains 25% of its original carbon – 14.

The age of the fossil, in years, is

- | | |
|-----------|-----------|
| A) 5 730 | B) 2 865 |
| C) 11 460 | D) 17 190 |

Question 24

The expression $\log_a b + 4\log_a(ac) - 4$, where $a, b, c > 1$, written as a single logarithm, is

- A) $\log_a \left(\frac{bc^4}{4} \right)$
- B) $\log_a (b^4 c^4)$
- C) $\log_a (4bc)$
- D) $\log_a (bc^4)$

Question 25

If $3^{2x-1} = 7$, then the value of x , to the nearest hundredth, is

Answer Key

- | | | |
|------|----------|----------|
| 1. A | 10. D | 19. 1.7 |
| 2. B | 11. A | 20. A |
| 3. B | 12. 9 | 21. B |
| 4. C | 13. 5 | 22. 8 |
| 5. A | 14. C | 23. C |
| 6. D | 15. B | 24. D |
| 7. B | 16. 11.9 | 25. 1.39 |
| 8. C | 17. D | |
| 9. A | 18. 9 | |

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