**Exponents and Logarithms**

1. The graph of, where b > 1, is translated such that the equation of the new graph is expressed as. The range of the new function is

A.  B.  C.  D. 

1. The graph of and the graph of , where *a* > 0, are reflections of each other about the

A. *x*-axis B. *y*-axis C. line *y* = *x* D. line *y* = -*x*

1. The *y*-intercept on the graph of is

A. *a* B. *b* C. 1 + *b* D. *a* + *b*

1. The graph of is reflected in the line . The equation of the transformed graph is

A.  B.  C.  D. 

1. The equation of the asymptote for the graph of , where  and , is

A.  B.  C.  D. 

1. *The graph of is transformed into the graph of by a translation of 5 units i and 4 units ii .*

The statement above is completed by the information in row

|  |  |  |
| --- | --- | --- |
| **Row** | *i* | *ii* |
| **A.** | *right* | *up* |
| **B.** | *left* | *up* |
| **C.** | *right* | *down* |
| **D.**  | *left* | *down* |

1. The graph of the logarithmic function  intersects the *x*-axis at

 A.  B. C. D.

1. For the graph of , where 0 < *b* < 1, the domain is

A.  B.  C.  D. 

1. The range of  is

A.  B.  C.  D. 

1. If , , then the inverse function equation can be expressed as

 A. B. C. D.

1. The expressionis equivalent to

A. 2 B. 6 C.  D. 

1. **Numerical Response:** The value of is \_\_\_.
2. The equation can be written in exponential form as

A.  B.  C.  D. 

1. The equation  can also be written as

 A.  B.  C. D.

1. If , and expression for is

 A.  B. C. D.

1. The equation of the asymptote of the graph of  is

 A.  B. C. D.

1. The expression is equivalent to

A.  B.  C.  D. 

*Use the following information to answer the next question.*

|  |
| --- |
| Numbered logarithmic expressions. |
| 1. |  | 2. |  |
| 3. |  | 4. |  |

1. **Numerical Response:** The value of the numbered logarithms above in order from least to greatest is \_\_\_, \_\_\_\_, \_\_\_, \_\_\_.
2. Express  as a single logarithm.

A.  B. 

C.  D. 

1. Written as a single logarithm, is

A.  B. 

C.  D. 

1. **Numerical Response:** Given that  and , the value of is \_\_\_.
2. If , then in terms of *x* and *y* is

 A.  B. C. D. 

1. The value of *x* in the equation is

 A. 2 B. 3 C. 5 D. 

1. An expression equivalent to is

 A.  B.

 C. D.

1. If , then the value of *x* is

A.  B. C. 2 D. 100

*Use the following information to answer the next question.*

A student’s work to simplify a logarithmic expression is shown below, where *a* > 1.



1. The student made his **first** error when going from:

A. Step 1 to Step 2 B. Step 2 to Step 3

C. Step 3 to Step 4 D. Step 4 to Step 5

1. **Numerical Response:**  If *b·c* = *a*, then the value of + is \_\_\_.
2. If , then ***x*** is

A.  B. 5 C.  D. 3

1. If , then ***x*** can be expressed as

 A.  B.

 C. D.

1. Determine the domain of the function 

 A.  B.  C.  D. 

1.  If , which of the following is the best graph of ?
2. If *b*·*c* = a, then the value of + is

## A. 2 B. 1 C. 4 D. 3

1. Which of the following expressions is equivalent to 

A.  B.  C.  D. 

1. Earthquake intensity is given by  where is the reference intensity and *m* is magnitude. A recent earthquake in Washington measured a magnitude of 6.3 on the Richter scale. In 1964, the Alaskan earthquake measured 8.5. How many times as intense was the 1964 Alaskan earthquake compared to the recent Washington earthquake?

A. 1.35 B. 2.2 C.  D. 

1. The number of bacteria, *n*, present in a culture doubles every 5 days. Which equation could be used to determine the number of bacteria present after *t* days if there are initially750 bacteria?

A.  B.  C.  D. **

1. A culture starts with 3000 bacteria and after 3 h, it reaches 48 000 bacteria. For the culture, the doubling time, to the nearest minute, is

 A. 19 min B.28 min C.45 min D.80 min

1. **Numerical Response:** The solution of , to the nearest hundredth, is \_\_\_\_\_.
2. **Numerical Response:** The value of ***x*** in the equation , to the nearest hundredth, is \_\_\_\_\_\_.
3. **Numerical Response:** Earthquake intensity is given by , where  is the reference intensity and *m* is magnitude. A particular major earthquake of magnitude 7.9 is 120 times as intense as a particular minor earthquake. The magnitude, to the nearest tenth, of the minor earthquake is \_\_\_\_\_\_
4. **Numerical Response:** The exact solution to the equation  can be expressed in simplified form as .

The value of *a* is \_\_\_\_

The value of *b* is \_\_\_\_

1. **Numerical Response:** The solution to the equation  can be expressed as .

The value of *a* is \_\_\_\_

The value of *b* is \_\_\_\_

The value of *c* is \_\_\_\_

The value of *d* is \_\_\_\_

1. Which statement is true regarding the solutions to the equation ?

A The solutions are -2 and 6.

B. The solution is -2 since 6 is extraneous.

C. The solution is 6 since -2 is extraneous.

D. The solution is a null set.

*Use the following information to answer the next question.*

Earthquake intensity is given by , where  is the reference intensity and *M* is the magnitude. An earthquake measuring 5.3 on the Richter scale is 125 times more intense than a second earthquake.

1. **Numerical Response:** The Richter scale measure of the second earthquake, to the nearest tenth, is \_\_\_.
2. **Numerical Response:** The population of a particular town was 20 000. If the population decreases at an average annual rate of 1.4%, the number of entire years it take for the population to reach 15 333 is \_\_\_\_.
3. If and , then the value of *k*, to the nearest whole number, is \_\_\_.

*Use the following information to answer the next question.*

 The estimated value of a particular painting is given by the equation, where  is the original price, *t* is the number of years from the original purchase date, and *V* is the value after *t* years.

1. **Numerical Response:** The number of years, to the nearest tenth, that it will take for the painting to increase to 10 times its original value is \_\_\_\_ years.

*Use the following information to answer the next question.*

 A student graphed the following equations:

 Equation I 

 Equation II 

 Equation III 

 Equation IV 

1. A student could estimate the solution to the equation  by using the graphs of equations

A. I and II B. I and III C. II and III D. II and IV

1. The expression is equivalent to

A. 3 B. 4 C. 3a D. 

1. The equation is equivalent to

A.  B.  C.  D. 

1. If , where *y* > 0 and *x* > 0, then *y* is equal to

A.  B.  C.  D. 

1. The graph of  is transformed to .The range of the transformed graph is

A.  B.  C.  D. 

1. The solution to the equation is

A.2 B.3 C.5 D. -3, 2

1. Greg invested $2000 at 4% per annum compounded monthly. How many years will it take for the investment to grow to 14304?

A. 4 years B. 5 years C.6 years D. 7 years

1. The half-life of a tracer element in the human body is 100 minutes. At noon, the mass of the tracer element is 0.700 g. Correct to the nearest thousandth of a gram, the expected mass of the same tracer element in 320 minutes is

A.0.093 g B.0.076 g C.0.066 g D. 0.044 g

1. Given , an expression for  could be

A. B.  C.  D. 

1. The graph of  is equivalent to the graph of

A. B.  C.  D. 

1. The decibel level of a sound may be calculated using the formula , where L is the loudness of the sound (dB) and I is the intensity of the sound. An equation that could be used to solve for the value of I is

A. B.  C.  D. 

1. The decibel level of a sound may be calculated using the formula , where L is the loudness of the sound (dB) and I is the intensity of the sound. The loudness of a jet engine is 150 dB. The intensity is

A. B.  C. 1000 D. 

1. The pH of a solution can be calculated using the formula , where  is the concentration of hydronium ions in the solution in mol/L. The pH level of vinegar is 2.8. The hydronium concentration of vinegar is 250 000 times greater than the hydronium concentration in baking soda. An equation that could be used to determine the pH level of baking soda,  is

A. B. 

C.  D. 

**Exponents and Logarithms Answers**

1. A

2. B

3. D

4. D

5. C

6. B

7. A

8. A

9. D

10. B

11. A

12. 6

13. B

14. D

15. C

16. A

17. A

18. 4231

19. A

20. C

21. 18

22. B

23. A

24. C

25. B

26. B

27. 1

28. B

29. D

30. A

31. C

32. A

33. B

34. D

35. A

36. D

37. 8.14

38. 0.36

39. 5.8

40. 307

41. 3525

42. C

43. 3.2

44. 19

45. 16

46. 12.6

47. D

48. A

49. D

50. D

51. D

52. A

53. B

54. B

55. C

56. C

57. C

58. C

59. B