1. Chapter 3, Section 3.1, Question 010

Evaluate the expression. Do not use a calculator for this exercise.

$\log_2 512 =$ ☐ *1

Significant digits not applicable; exact number, no tolerance

2. Chapter 3, Section 3.1, Question 012

Evaluate the expression. Do not use a calculator for this exercise.

$\log_2 \dfrac{1}{2048} =$ ☐ *1

Significant digits not applicable; exact number, no tolerance

3. Chapter 3, Section 3.1, Question 014

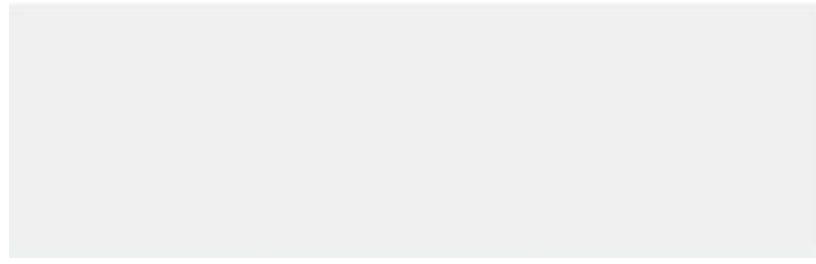Evaluate the expression. Do not use a calculator for this exercise.

$\log_{1024} 2 =$ ☐

4. Chapter 3, Section 3.1, Question 042

Find a number x such that $\log_4(3x + 1) = -2$.

Enter the exact answer.

$x =$

5. Chapter 3, Section 3.1, Question 046

Find a number x such that

$$\frac{10^x + 2.7}{10^x + 2} = 1.1.$$

Round your answer to three decimal places.

$x = $ [_____] *1

Significant digits not applicable; the absolute tolerance is +/-0.002

6. Chapter 3, Section 3.1, Question 052

Find a formula for the inverse function f^{-1} of the function f.

$$f(x) = 6^{x+7}$$

$f^{-1}(y) = $

7. Chapter 3, Section 3.1, Question 058

Find a formula for the inverse function f^{-1} of the function f.

$$f(x) = 2 \cdot 3^x - 4$$

$f^{-1}(y) = $

8. Chapter 3, Section 3.1, Question 063

Find a formula for the inverse function f^{-1} of the function f.

$$f(x) = 9 + 7\log_4(3x + 2)$$

$f^{-1}(y) =$

9. Chapter 3, Section 3.2, Question 004

Suppose x is such that $\log_6 x = 83.39$. Evaluate $\log_6 x^{10}$.

$\log_6 x^{10} =$ [   ] *1

Significant digits not applicable; exact number, no tolerance

10. Chapter 3, Section 3.2, Question 006

Find all numbers x such that the equation holds.

$$7^x = 2$$

Round your answer to six decimal places.

$x =$ [   ] *1

Significant digits not applicable; the absolute tolerance is +/-0.000001

11. Chapter 3, Section 3.2, Question 025

About how many hours will it take for a sample of radon-222 to have only one sixteenth as much radon-222 as the original sample? [**Hint:** The half-life of radon-222 is about 92 hours.]

[   ] *1 hours

Significant digits not applicable; exact number, no tolerance

12. Chapter 3, Section 3.2, Question 029

Suppose a radioactive isotope is such that one-fifth of the atoms in a sample decay after four years. Find the half-life of this isotope.

Round your answer to one decimal place.

[   ] *1 years

Significant digits not applicable; the absolute tolerance is +/-0.1

13. Chapter 3, Section 3.2, Question 040

Evaluate the indicated quantity. Your calculator is unlikely to be able to evaluate logarithms using any of the bases in these exercises, so you will need to use an appropriate change of base formula.

Round your answer to three decimal places.

$\log_{5.02} 88.7 =$ [   ] *1

Significant digits not applicable; the absolute tolerance is +/-0.002

14. Chapter 3, Section 3.3, Question 014

Evaluate the given quantity assuming that

$$\log_{16} u = 4.1 \quad \text{and} \quad \log_{16} v = 4.4.$$

$\log_{16}(4uv) = $ [   ] *1

Significant digits not applicable; exact number, no tolerance

15. Chapter 3, Section 3.3, Question 022

Evaluate the given quantity assuming that

$$\log_6 u = 0.8 \quad \text{and} \quad \log_6 v = 7.5.$$

$\log_6\left(u^3 v^9\right) = $ [   ] *1

Significant digits not applicable; exact number, no tolerance

16. Chapter 3, Section 3.3, Question 020

Evaluate the given quantity assuming that
$$\log_4 u = 7.6.$$

$\log_4 \dfrac{1}{\sqrt{u}} = $ [   ] *1

Significant digits not applicable; exact number, no tolerance

17. Chapter 3, Section 3.3, Question 028

Find all numbers x that satisfy the given equation.

$$\log_6(x + 6) - \log_6(x - 4) = 3$$

Give an exact answer.

$x =$

[   ]

18. Chapter 3, Section 3.3, Question 030

Find all numbers x that satisfy the given equation.

$$\log_5(x + 4) + \log_5(x + 2) = 2$$

Give an exact answer.

$x =$

19. Chapter 3, Section 3.4, Question 008

Suppose you deposit into a savings account one cent on January 1, two cents on January 2, four cents on January 03, and so on, doubling the amount of your deposit each day (assume that you use an electronic bank that is open every day of the year).

What is the first day that your deposit will exceed $\$100,000$?

[   ] [   ]

20. Chapter 3, Section 3.4, Question 016

A colony of bacteria is growing exponentially, doubling in size every 230 minutes. How many

minutes will it take for the colony of bacteria to become seven times its current size?

Round your answer to the nearest minute.

It will take [   ]*1 minutes for the colony of bacteria to become seven times
its current size.

Significant digits not applicable; the absolute tolerance is +/-1

21. Chapter 3, Section 3.4, Question 018

At current growth rates, the Earth's population is doubling about every 69 years. If this

growth rate were to continue, about how many years will it take for the Earth's population to
become one-tenth larger than the current level?

Round your answer to one decimal place.

It will take approximately [   ]*1 years for the Earth's population to become
one-tenth larger than the current level.

Significant digits not applicable; the absolute tolerance is +/-0.1

22. Chapter 3, Section 3.4, Question 026

Suppose a savings account pays 6% interest per year, compounded four times per year. If

the savings account starts with $\$1200$, how many years would it take for the savings

account to exceed $\$2200$?

Round your answer to the next quarter year, e.g. 25 years, 25.25 years, 25.50 years

or 25.75 years, etc.

It would take [   ]*1 years for the savings account to exceed $\$2200$.

Significant digits not applicable; the absolute tolerance is +/-0.25

23. Chapter 3, Section 3.4, Question 028

Suppose a bank wants to advertise that $\$9000$ deposited in its savings account will grow to $\$9360$ in one year. This bank compounds interest 365 times per year. What annual interest rate must the bank pay?

Round your answer to two decimal places.

The bank must pay [   ]^{*1} % interest.

Significant digits not applicable; the absolute tolerance is +/-0.01

24. Chapter 3, Section 3.5, Question 012

Find a number w such that $\ln(2w - 2) = 7$.

$w =$

25. Chapter 3, Section 3.5, Question 014

Find all numbers r such that $\ln\left(7r^2 - 2\right) = -1$.

Enter the exact answers in increasing order.

$r =$

$r =$

26. Chapter 3, Section 3.5, Question 016

Find a number V such that $e^{3y-10} = 5$.

$y =$

27. Chapter 3, Section 3.5, Question 032

Find the number t that makes e^{t^2+6t+6} as small as possible.

$t =$ [   ] *1

Significant digits not applicable; exact number, no tolerance

28. Chapter 3, Section 3.5, Question 040

Answer the following questions for the function $f(x) = 12 - \ln x$.

(a) Find the domain of f.

Enter your answer in interval notation.

(b) Find the range of f .

Enter your answer in interval notation.

(c) Find the formula for f^{-1} .

You can check your solution by verifying that $f^{-1} \circ f = I$ and $f \circ f^{-1} = I$. (Recall that I is the function defined by $I(x) = x$.)

$$f^{-1}(y) =$$

(d) Find the domain of f^{-1} .

Enter your answer in interval notation.

(e) Find the range of f^{-1}.

Enter your answer in interval notation.

29. Chapter 3, Section 3.5, Question 044

Answer the following questions for the function $f(x) = 13e^{17x}$.

(a) Find the domain of f.

Enter your answer in interval notation.

(b) Find the range of f .

Enter your answer in interval notation.

(c) Find the formula for f^{-1} .

You can check your solution by verifying that $f^{-1} \circ f = I$ and $f \circ f^{-1} = I$. (Recall that I is the function defined by $I(x) = x$.)

$$f^{-1}(y) =$$

(d) Find the domain of f^{-1} .

Enter your answer in interval notation.

(e) Find the range of f^{-1}.

Enter your answer in interval notation.

30. Chapter 3, Section 3.7, Question 004

How much would you need to deposit in a bank account paying 7% annual interest

compounded continuously so that at the end of 15 years you would have $\$19,000$?

Round your answer to the nearest dollar.

You would need to deposit $\$$ [_____]***1** in a bank account now.

Significant digits not applicable; the absolute tolerance is +/-1

31. Chapter 3, Section 3.7, Question 008

Suppose a colony of bacteria has a continuous growth rate of 24% per hour. By what percent
will the colony have grown after eleven hours?
Round the answer to the nearest percent.

The colony will have grown by [_____]***1** $\%$.

Significant digits not applicable; the absolute tolerance is +/-1

32. Chapter 3, Section 3.7, Question 030

Suppose a colony of bacteria has doubled in ten hours. What is the approximate continuous growth rate of this colony of bacteria?

The approximate continuous growth rate is [   ]*1 %.

Significant digits not applicable; exact number, no tolerance