49. What is the value of $\log_2 8$?

A. 3
B. 4
C. 6
D. 10
E. 16

60. What is the real value of x in the equation $\log_2 24 - \log_2 3 = \log_5 x$?

F. 3
G. 21
H. 72
J. 125
K. 243

17. What is the value of $\log_4 64$?

a. 3

b. 16

c. 2

d. –4

e. 644

27. If $\log_3 x = 2$, then $x = ?$

a. 6

b. 9

c. $\frac{2}{3}$

d. 4

e. $\frac{1}{2}$

49. In the real numbers, what is the solution of the equation $8^{2x+1} = 4^{1-x}$?

A. $-\frac{1}{3}$

B. $-\frac{1}{4}$

C. $-\frac{1}{8}$

D. 0

E. $\frac{1}{7}$

53. Whenever x, y, and z are positive real numbers, which of the following expressions is equivalent to $2 \log_3 x + \frac{1}{2} \log_6 y - \log_3 z$?

A. $\log_3\left(\frac{x^2 y}{z}\right)$

B. $\log_3\left(\frac{x^2}{z}\right) + \log_6\left(\sqrt{y}\right)$

C. $\log_3\left(\frac{z}{x^2}\right) + \log_6\left(\frac{y}{2}\right)$

D. $\log_3(x - z) + \log_6\left(\sqrt{y}\right)$

E. $2 \log_3(x - z) + \log_6\left(\frac{y}{2}\right)$

Which of the following is a value of x that satisfies $\log_x 25=2$?

Possible Answers:

4

12.5

5

125

10

Correct answer:

5

Let log 5 = 0.69897 and log 2 = 0.30103. Solve log 50

Possible Answers:

1.30103

1.68794

1.36903

1.39794

1.69897

Correct answer:

1.69897

Explanation:

Using properties of logs:

$\log (xy) = \log x + \log y$

$\log (x^n) = n \log x$

$\log 10 = 1$

So $\log 50 = \log (10 * 5) = \log 10 + \log 5 = 1 + 0.69897 = 1.69897$

$y = 2^x$

If y = 3, approximately what is x?

Round to 4 decimal places.

Possible Answers:

1.5850

0.6309

1.3454

2.0000

1.8580

Correct answer:

1.5850

Explanation:

To solve, we use logarithms. We log both sides and get: $\log 3 = \log 2^x$

which can be rewritten as $\log 3 = x \log 2$

Then we solve for x: $x = \log 3/\log 2 = 1.5850 \ldots$

Evaluate

$\log_3 27$

Possible Answers:

3

30

9

10

27

Correct answer:

3

Explanation:

You can change the form to

$3^x = 27$

$x = 3$

If $\log_x 49 = 2$, what is x?

Possible Answers:

0

10

2401

7

24.5

Correct answer:

7

Explanation:

If $\log_x y = z$, then $x^z = y$

$x^2 = 49$

$x = 7$

If $\log_4 x = 2$, what is the square root of x?

Possible Answers:

3

16

4

12

2

Correct answer:

4

Explanation:

Given $\log_4 x = 2$, we can determine that 4 to the second power is x; therefore the square root of x is 4.

Solve for x in the following equation:

$\log_2 24 - \log_2 3 = \log_x 27$

Possible Answers:

3

-2

9

2

1

Correct answer:

3

Explanation:

Since the two logarithmic expressions on the left side of the equation have the same base, you can use the quotient rule to re-express them as the following:

$\log_2 24 - \log_2 3 = \log_2(24/3) = \log_2 8 = 3$

Therefore we have the following equivalent expressions, from which it can be deduced that $x = 3$.

$\log_x 27 = 3$

Solve for x in the following equation:

$\log_2 24 - \log_2 3 = \log_x 27$

Possible Answers:

3

-2

9

2

1

Correct answer:

3

Explanation:

Since the two logarithmic expressions on the left side of the equation have the same base, you can use the quotient rule to re-express them as the following:

$\log_2 24 - \log_2 3 = \log_2(24/3) = \log_2 8 = 3$

Therefore we have the following equivalent expressions, from which it can be deduced that $x = 3$.

$\log_x 27 = 3$

$x^3 = 27$

What value of x satisfies the equation $\log_x 64 = 2$?

Possible Answers:

6

2

4

8

10

Correct answer:

8

Explanation:

The answer is 8.

$\log_x 64 = 2$ can by rewritten as $x^2 = 64$.

In this form the question becomes a simple exponent problem. The answer is 8 because $8^2 = 64$.

If $\log_2 64 = x$, what is x ?

Possible Answers:

3

6

4

5

7

Correct answer:

6

Explanation:

Use the following equation to easily manipulate all similar logs:

$\log_a b = x$ changes to $a^x = b$.

Therefore, $\log_2 64 = x$ changes to $2^x = 64$.

2 raised to the power of 6 yields 64, so x must equal 6. If finding the 6 was difficult from the formula, simply keep multiplying 2 by itself until you reach 64.

Which of the following is a value of x that satisfies $\log_x 64 = 2$?

Possible Answers:

8
4
2
32
16

Correct answer:

8

Explanation:

The general equation of a logarithm is $\log_x a = b$, and $x^b = a$

In this case, $x^2 = 64$, and thus $x = 8$ (or -8, but -8 is not an answer choice)

How can we simplify this expression below into a single logarithm?

$3log(x) + \frac{1}{2}log(4y) - log(z)$

Possible Answers:

$log(2x^3 + y^{\frac{1}{2}} - z)$

$log(\frac{4x^3y^{\frac{1}{2}}}{z})$

Cannot be simplified into a single logarithm

$\frac{3}{2}log(\frac{4xy}{z})$

$log(\frac{2x^3y^{\frac{1}{2}}}{z})$

Correct answer:

$log(\frac{2x^3y^{\frac{1}{2}}}{z})$

Explanation:

Using the property that $log(x^n) = nlog(x)$, we can simplify the expression to $log(x^3) + log((4y)^{\frac{1}{2}}) - log(z)$.

Given that $log(xy) = log(x) + log(y)$ and $log(\frac{x}{y}) = log(x) - log(y)$

We can further simplify this equation to $log(\frac{2x^3y^{\frac{1}{2}}}{z})$

What is the value of $\log_2(64)$? Round to the nearest hundredth.

Possible Answers:

1.81

4.5

4.16

7

6

Correct answer:

6

Explanation:

You could solve this by using your calculator. Remember that you will have to translate this into:

$\frac{log(64)}{log(2)}$

Another way you can solve it is by noticing that $64 = 2^6$

This means you can rewrite your logarithm:

$log_2(2^6)$

Applying logarithm rules, you can factor out the power:

$log_2(2^6) = 6log_2(2)$

For any value n, $log_n(n) = 1$. Therefore, $log_2(2) = 1$. So, your answer is 6.

Solve for x

$5^{x+1} = 60.$

Round to the nearest hundredth.

Possible Answers:

3.73

1.75

1.54

2.54

4.73

Correct answer:

1.54

Explanation:

To solve an exponential equation like this, you need to use logarithms. This can be translated into:

$log_5(60) = x + 1$

Now, remember that your calculator needs to have this translated. The logarithm $log_5(60)$ is equal to the following:

$\frac{log(60)}{log(5)}$, which equals approximately 2.54.

Remember that you have the equation:

$2.54 = x + 1$

Thus, $x = 1.54$.

Solve the following equation

$3^{2x-4} = 44.$

Possible Answers:

7.31

4

2.11

3.44

3.72

Correct answer:

3.72

Explanation:

In order to solve a question like this, you will need to use logarithms. First, start by converting this into a basic logarithm:

$log3(44) = 2x - 4$

Recall that you need to convert $log3(44)$ for your calculator:

$\frac{log(44)}{log(3)}$, which equals approximately 3.44

Thus, you can solve for x:

$3.44 = 2x - 4$

$2x = 7.44$

$x = 3.72$

At the end of each year, an account compounds interest at a rate of 4.5%. If the account began with $\$1400$, how many years will it take for it to reach a value of $\$5000$, presuming no withdrawals or deposits occur?

Possible Answers:

28

40

39

21

29

Correct answer:

29

Explanation:

The general function that defines this compounding interest is:

$value = 1.045^t * 1400$, where t is the number of years.

What we are looking for is:

$1.045^t * 1400 = 5000$

You can solve this using a logarithm. First, isolate the variable term by dividing both sides:

$$1.045^t = \frac{5000}{1400}$$

Which is:

$$1.045^t = \frac{25}{7}$$

Next, recall that this is the logarithm:

$$t = log_{1.045}(\frac{25}{7})$$

For this, you will need to do a base conversion:

$$log_{1.045}(\frac{25}{7}) = \frac{log(\frac{25}{7})}{log(1.045)}$$

This is $28.9199397858296...$

This means that it will take 29 years. 28 is too few and at the end of 29, you will have over 5000.

What is the value of $\log_{4.5}(381)$? Round to the nearest hundredth.

Possible Answers:

8.14

4.31

3.95

5.94

2.58

Correct answer:

3.95

Explanation:

Remember that you will need to calculate your logarithm by doing a base conversion. This is done by changing $log_{4.5}(381)$ into:

$$\frac{log(381)}{log(4.5)}$$

Using your calculator, you can find this to be:

$3.95112604435386...$ or approximately 3.95

if $log4(16) = x$, **what is** $log2(x)$ **?**

Possible Answers:

$x = 2$

$x = 0$

$x = 1/2$

$x = 4$

$x = 1$

Correct answer:

$x = 1$

Explanation:

The first step of this problem is to find

$\log_4(16)$ by expanding to the formula

$4^y = 16.$

y is found to be 2. The next step is to plug y in to the second log.

$log2(2)$, which expands to

$2^x = 2,$

$x = 1$

Find $log2(log3(81))$.

Possible Answers:

$x = 0$

$x = 1$

$x = 1/3$

$x = 2$

$x = 1/2$

Correct answer:

$x = 2$

Explanation:

$log3(81)$

expands to

$3^y = 81, y = 4$

$log2(4)$

expands to

$2^x = 4, x = 2$

Simplify:

$\log\ a^2 + \log\ b + \log\ c^3.$

Possible Answers:

$\log\left(\frac{2ab}{3c}\right)$

$\log\left(\frac{ab}{c}\right)$

$\log\left(a^2bc^3\right)$

$\log\left(\frac{a^2b}{c}\right)$

$\log\left(6abc\right)$

Correct answer:

$\log\left(\frac{2ab}{3c}\right)$

Explanation:

Here, we need to make use of some logarithm identities: $\log(a^n) = n * \log(a) log(a) + \log(b) = \log(ab)$

and $\log(a) - \log(b) = log(\frac{a}{b}).$

Therefore, putting all of those things together, we get the final answer of $\log\ a^2 + \log\ b + \log\ c^3 = \log(\frac{2ab}{3c}).$

If

$\log_4 x = \frac{5}{2}$,

then what is x?

Possible Answers:

16
8
64
32
128

Correct answer:

32

Explanation:

This is a test of translating logarithmic/exponential properties, with the key here being to realize that

$\log_4 x = \frac{5}{2}$ is equivalent to $x = 4^{5/2}$.

With that in mind, here is how it works out:

$4^{5/2} = (\sqrt[2]{4})^5 = 2^5 = 2 * 2 * 2 * 2 * 2 = 32$

Hence, $x = 32$.

$\dfrac{\log 25}{\log 5}$ **can be written as which of the following?**

A. $\dfrac{\log_{10}25}{\log_{10}5}$

B. $\log_5 25$

C. 2

Possible Answers:

B only

B and C only

A only

A, B and C

A and B only

Correct answer:

A, B and C

$\frac{\log 25}{\log 5}$ **can be written as which of the following?**

A. $\frac{\log_{10} 25}{\log_{10} 5}$

B. $\log_5 25$

C. 2

Possible Answers:

B only

B and C only

A only

A, B and C

A and B only

Correct answer:

A, B and C

Explanation:

A is true in two ways. You can use the fact that if a logarithm has no base, you can use base 10, or you can use the fact that you can use this property:

$$\log_a b = \frac{\log_c b}{\log_c a}$$

B is a simple change of base application, and C is simply computing the logarithm.

$$\log_5 25 = \frac{\log_{10} 25}{\log_{10} 5}$$

$$\log_5 25 \rightarrow \log_a b = c \rightarrow a^c = b$$

$$\log_5 25$$
$$5^x = 25$$
$$5^2 = 25$$
$$x = 2$$