

Example 1.

The root of the equation $\log_2 x + x - 2 = 0$, which is within the segment $[1, 2]$.

Record of calculations:

Interval = $[1, 2]$.

$$f(1) = 1$$

$$f(1.001) = 0.99755802582609$$

$$f(1.002) = 0.99511749146688$$

$$f(1.003) = 0.99267839404991$$

$$f(1.004) = 0.99024073071132$$

$$f(1.005) = 0.9878044985958$$

$$f(1.006) = 0.98536969485656$$

$$f(1.007) = 0.9829363166553$$

$$f(1.008) = 0.98050436116217$$

$$f(1.009) = 0.97807382555573$$

$$f(1.01) = 0.97564470702293$$

$$f(1.011) = 0.97321700275907$$

$$f(1.012) = 0.97079070996778$$

$$f(1.013) = 0.96836582586095$$

$$f(1.014) = 0.96594234765875$$

$$f(1.015) = 0.96352027258955$$

etc.

Answer:

$$x = 1.457$$

Example 2.

The root of the equation $2^x - 4x = 0$, which is within the segment $[0, 1]$.

Record of calculations:

Interval = $[0, 1]$.

$$f(0) = 1$$

$$f(0.0001) = 0.99966931712038$$

$$f(0.0002) = 0.99933863904562$$

$$f(0.0003) = 0.99900796577605$$

$$f(0.0004) = 0.99867729731202$$

$$f(0.0005) = 0.99834663365385$$

$$f(0.0006) = 0.99801597480187$$

$$f(0.0007) = 0.99768532075642$$

$$f(0.0008) = 0.99735467151783$$

$$f(0.0009) = 0.99702402708644$$

$$f(0.001) = 0.99669338746258$$

$f(0.0011) = 0.99636275264658$
 $f(0.0012) = 0.99603212263877$
 $f(0.0013) = 0.99570149743949$
 $f(0.0014) = 0.99537087704908$
 $f(0.0015) = 0.99504026146786$

etc.

Answer:

$x = 0.3099$

Example 3.

The root of the polynomial $x^5 - 10x - 2$, which is within the segment $[-2, -1]$.

Record of calculations:

Interval = $[-2, -1]$.

Length of the interval = 1.

The interval is divided by 10000.

Length of the subinterval = 0.0001.

$f(-2) = 14$

$f(-1.9999) = 13.99300079996$

$f(-1.9998) = 13.98600319968$

$f(-1.9997) = 13.97900719892$

$f(-1.9996) = 13.97201279744$

$f(-1.9995) = 13.965019995001$

$f(-1.9994) = 13.958028791361$

$f(-1.9993) = 13.951039186282$

$f(-1.9992) = 13.944051179524$

$f(-1.9991) = 13.937064770847$

$f(-1.999) = 13.93007996001$

$f(-1.9989) = 13.923096746775$

$f(-1.9988) = 13.916115130901$

$f(-1.9987) = 13.909135112149$

$f(-1.9986) = 13.902156690278$

$f(-1.9985) = 13.895179865051$

etc.

Answer:

$x = -1.7243$

Example 3.

The root of the polynomial $x^5 - 10x - 2$, which is within the segment $[-1, 0]$.

Record of calculations:

Interval = [-1,0].

Length of the interval = 1.

The interval is divided by 10000.

Length of the subinterval = 0.0001.

$$f(-1) = 7$$

$$f(-0.9999) = 6.99949990001$$

$$f(-0.9998) = 6.99899960008$$

$$f(-0.9997) = 6.99849910027$$

$$f(-0.9996) = 6.9979984006399$$

$$f(-0.9995) = 6.9974975012497$$

$$f(-0.9994) = 6.9969964021594$$

$$f(-0.9993) = 6.9964951034288$$

$$f(-0.9992) = 6.9959936051118$$

$$f(-0.9991) = 6.9954919072867$$

$$f(-0.999) = 6.994990009995$$

$$f(-0.9989) = 6.9944879133027$$

$$f(-0.9988) = 6.9939856172696$$

$$f(-0.9987) = 6.9934831219557$$

$$f(-0.9986) = 6.9929804274208$$

$$f(-0.9985) = 6.9924775337247$$

etc.

Answer:

$$x = -0.2000$$

Example 3.

The root of the polynomial $x^5 - 10x - 2$, which is within the segment [1, 2].

Record of calculations:

Interval = [1,2].

Length of the interval = 1.

The interval is divided by 10000.

Length of the subinterval = 0.0001.

$$f(1) = 11$$

$$f(1.0001) = 11.00049989999$$

$$f(1.0002) = 11.00099959992$$

$$f(1.0003) = 11.00149909973$$

$$f(1.0004) = 11.00199839936$$

$$f(1.0005) = 11.00249749875$$

$$f(1.0006) = 11.002996397839$$

$$f(1.0007) = 11.003495096569$$

$$f(1.0008) = 11.003993594878$$

$$f(1.0009) = 11.004491892707$$

$$f(1.001) = 11.004989989995$$

$$f(1.0011) = 11.005487886683$$

$$f(1.0012) = 11.00598558271$$

$$f(1.0013) = 11.006483078016$$

$$f(1.0014) = 11.006980372541$$

$$f(1.0015) = 11.007477466225$$

etc.

Answer:

$$x = 1.8251$$