Appropriate Level of Accuracy

Appropriate level of accuracy is when the upper and lower bounds of a particular calculation agree to a number of significant figures.

The following measurements were recorded from a pendulum experiment (simulated).

L = 1.49m (3 s.f)

T = 2.449*s* (4 s.f)

π = as found in calculators

The basic relationship is:

$$T = 2\pi\sqrt{\frac{L}{g}}$$

Where, L = the length of pendulum

T = time period of one complete swing

g = acceleration due to gravity

So, making g the subject gives:

$$g = \frac{4\pi^2 L}{T^2}$$

Now, the upper bound of T = 2.4495*s* the upper bound of L = 1.495*m*

the lower bound of T =2.4485*s* the lower bound of L = 1.485*m*

So, upper bound of $g = \frac{4\pi^2 \times 1.495}{2.4485^2} = 9.8447 ms^{-2}$

lower bound of g = $\frac{4\pi^2 \times 1.485}{2.4495^2} = 9.7708 ms^{-2}$

Now, what is the appropriate level or degree of accuracy?