In an experiment to find \( g \), a steel bar is dropped from rest through a vertical distance of 40cm. The time taken is 0.29s. What value for \( g \) does this result give?

\[
g = a = ?
\]

\[
U = 0 \text{ ms}^{-1}
\]

\[
S = 40 \text{ cm}
\]

\[
V = ?
\]

\[
t = 0.29 \text{ s}
\]

Write down everything you know. Use this to choose a suitable equation.

\[
V = U + at
\] (no. too many unknowns)

\[
S = Ut + \frac{1}{2}at^2
\] (Yes)

\[
V^2 = U^2 + 2as
\] (no. too many unknowns)

\[
S = Ut + \frac{1}{2}at^2
\]

\[
0.4 = (0 \times 0.29) + \left( \frac{1}{2} \times a \times 0.29^2 \right)
\]

\[
0.4 = \frac{a \times 0.29^2}{2}
\]

\[
a = \frac{2 \times 0.4}{(0.29)^2}
\]

\[
a = 9.5 \text{ ms}^{-2}
\]

*Must convert from cm to metres.*