



In this video, we will run through a problem for Compound Interest and the use of Single Payment Formulas.

The topic of Compound Interest and Single Payment Formulas falls under the main category of Engineering Economics.

Equations, Symbols, Tables, and information on the various topics covered in Engineering Economics can be referenced on pages 114-120 of the NCEES Supplied Reference Handbook, 8th edition, 2nd revision.

Problem:

A certain Machine costs \$25,000 to purchase today. The company takes a 5 year loan that has an option to defer any payment until the end of the 5th year and make one balloon payment. With an interest rate of 6%, what will the Machine actually cost the company after 5 years? Use the Compound Interest Tables.

Solution:

The question is asking what the FUTURE balloon payment would be if the company were to take a 5 year \$25,000 loan today with a 6% annual interest rate.

Like any of these Single Payment problems, we can determine this in one of two ways:

Either by using the Single Payment Compound Amount Formula found in the table on page 114 of the NCEES Supplied Reference Handbook, 8th edition, 2nd revision or using the functional notation version of the equation and referencing and using the Compound Interest Tables starting on page 116 of the NCEES Supplied Reference Handbook, 8th edition, 2nd revision. The problem calls for the use of the Compound Interest Tables.



The Single Payment Compound Formula written in functional notation for a Future Worth is $F = P(F/P, i, n)$ where the term $(F/P, i, n)$ can be defined using the given values (i, n) and the Compound Interest Tables starting on page 116 of the NCEES Supplied Reference Handbook, 8th edition, 2nd revision.

Again, we are given:

$$i = .06 \text{ (6\%)}$$

$$n = 5 \text{ years}$$

Referencing the Compound Interest Table for $i=6\%$ on page 118 of the NCEES Supplied Reference Handbook, 8th edition, 2nd revision, we locate $n = 5$ (far left column) and work our way horizontally to the factor F/P and find that:

$$(F/P, i, n) = 1.3382$$

Plugging this value in to the equation we get:

$$F = \$25,000(1.3382) = \$33,455$$

The equivalent Future value, balloon payment, for the \$25,000 loan at 6% annual interest is \$33,455.

Wrong Answers:

- 1) The equivalent Future value, balloon payment, for the \$25,000 loan at 6% annual interest is \$18,683.

It is important to make sure that you are referencing the correct term when using the Compound Interest Tables. In this case, you used the correct table and term for n , but referenced P/F instead of F/P .



- 2) The equivalent Future value, balloon payment, for the \$25,000 loan at 6% annual interest is \$262,144.

You used the Single Payment Compound Amount Formula as opposed to the Compound Interest Tables as the question suggested.

On top of that, you made a mistake in applying the interest rate. 6% is 6 one hundredths, or .06, when put in to your calculator. You incorrectly used .6 as i or a 60% interest rate, which would make for some incredibly unfortunate loan terms.

- 3) The equivalent Future value, balloon payment, for the \$25,000 loan at 6% annual interest is \$31,563.

It is important to make sure that you are referencing the correct table and components (i , n) of that table when using the Compound Interest Tables. Each table is notated and specifically defined for the interest rate we are working with. In this case, you referenced the correct table for 6% and F/P but did not track the correct n from the left column through to the factors. In the future, consider using a ruler to ensure you aren't jumping up and down on different values.

Reference:

<http://www.engineerintrainingexam.com/daily-carrot-engineering-economics-single-payment-formulas>