



# ACTUARIAL VALUATIONS

VERSION

# 4B



**Unitrust remainder examples — For one life, two lives, and terms certain**

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**For use in income, estate, and gift tax purposes**

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# ACTUARIAL TABLES ASSOCIATED WITH PUBLICATION 1458

The actuarial tables associated with this publication are:

Table	Type of Factors
Table U(1)	Single Life Factors
Table U(2)	2-Life Last to Die Unitrust Remainder Factors
	Part 1: Adjusted Payout Rates from 0.2 to 4.0%
	Part 2: Adjusted Payout Rates from 4.2 to 8.0%
	Part 3: Adjusted Payout Rates from 8.2 to 12.0%
	Part 4: Adjusted Payout Rates from 12.2 to 16.0%
	Part 5: Adjusted Payout Rates from 16.2 to 20.0%
Table D	Term Certain Factors
Table F	Payout Rate Adjustment Factors
Table Z	Commutation Factors
Table 2010CM	Mortality Table

# USE OF EXAMPLES AND TABLES

This publication provides examples for using actuarial factors for certain income, gift, and estate tax valuations of future interests. These examples use factors from actuarial tables associated with this publication. The actuarial tables are located at

[www.irs.gov/retirement-plans/actuarial-tables](http://www.irs.gov/retirement-plans/actuarial-tables)

The examples provided are for the computation of interests in unitrusts. A unitrust is a trust wherein the trustee is directed to pay annually a fixed percentage of the fair market value of the trust assets computed each year, either for a life or lives or for a term of years, or for a combination of lives and years. The fixed percentage is called the payout rate. If payments are made other than annually at the beginning of each year, the payout rate must be adjusted (using Table F) to compute the interest involved.

**Example A** provides the method of computing the Adjusted Payout Rate given the trust's stated payout rate and the Internal Revenue Code (IRC) Section 7520 interest rate.

**Example B** provides the valuation of the remainder interest in a unitrust which continues until the death of a single person.

**Example C** shows the method for computing the remainder interest following the death of the last to die of two persons.

**Example D** illustrates the computation of the term estate interest in a unitrust which continues for a term certain.

**Example E** shows the computation of a remainder interest following the earlier to occur of either the death of a person or the end of a term of years.

In all cases, appropriate factors may also be computed with software using the same actuarial formulas from which these factors are computed if the factors so computed have, respectively, at least as many significant figures as are shown in these examples.

The factors and tables associated with this publication involving life contingencies are derived from the values of  $l_x$  taken from the Life Table for the Total Population appearing as Table 1, in U.S. Decennial Life Tables for 2009-2011 published by the U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics. Values from that Table 1 appear in the associated set of actuarial tables in Section 6, labeled as Table 2010CM. However, in Table 2010CM the values of  $l_x$  are stated to seven digits.

## ASSOCIATED TABLES ON THE WEB

In the IRS [actuarial tables](#) on IRS.gov associated with this publication and these examples, the factors in Sections 1, 2, 3 and 5 are based on adjusted payout rates ranging from 0.2% to 20.0% in intervals of 0.2%. The factors in Sections 4 are based on interest rates ranging from 0.2% to 20.0% in intervals of 0.2%. The wide range of rates is shown pursuant to Internal Revenue Code (IRC) Section 7520, which requires the use of an interest rate of 120% of the annual mid-term applicable federal rate for the month in which the valuation date falls. This rate is referred to in this publication as the “Section 7520 rate,” or simply the “7520 rate.” All the factors associated with this publication reflect annual compounding of interest.

**Table U(1)** contains factors for the present worth of the remainder interest in a single life unitrust.

**Table U(2)** contains factors for the present worth of the remainder interest in a unitrust due at the death of the last to die of two persons.

**Table D** contains factors for the present worth of the remainder interest in a unitrust following a term certain.

**Table F** contains factors for computing adjusted payout rates for annual, semiannual, quarterly and monthly payment periods at interest rates from 0.2% to 20.0%.

**Table Z** contains commutation factors for the present worth of certain interests in a single life unitrust.

**Table 2010CM** contains factors is the underlying mortality table used to calculate factors involving life contingencies.

# HISTORICAL SYNOPSIS OF TABLES

Period	Table	Interest Rate	Publications
1-1-1951 to 12-31-1970	US1938	3.5%	11
1-1-1971 to 11-30-1983	Table LN	6%	723, 723A, 723B
12-1-1983 to 4-30-1989	Table CM	10%	723C, 723D, 723E
5-1-1989 to 4-30-1999*	80CNSMT	7520 rates	1457, 1458, 1459 (5-1989 release)
5-1-1999 to 4-30-2009	90CM	7520 rates	1457, 1458, 1459 (7-1999 release)
5-1-2009 to 5-31-2023**	2000CM	7520 rates	1457, 1458, 1459 (5-2009 release)
6-1-2023** to	2010CM	7520 rates	1457, 1458, 1459 (6-2023 release)

\*On October 22, 1988, IRC Section 7520 was enacted. It requires the use of an interest rate equal to 120% of the midterm applicable federal rate, rounded to the nearest 0.2%.

\*\*Transition period: For valuation dates from May 1, 2019, through June 1, 2023, you may rely on the actuarial tables based either on Table 2000CM or on Table 2010CM. However, you must be consistent in using the same set of tables to value each interest (income, remainder, partial, etc.) in the same property and with respect to all transfers occurring on the same valuation date.

# EXAMPLES

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## A. Adjusted Payout Rate

**Example 1.** If the unitrust makes the annual distributions in the form of installments paid periodically during the year, or if the unitrust makes payments annually at a time during the year other than one year from the annual valuation date, it is necessary to adjust the payout rate to reflect the periodic installments and the period of time between the annual valuation date and the payments. This results in an “adjusted payout rate,” which is used to find the factors in the actuarial tables.

For all the following examples, we assume that the unitrust pays out 5.0% per year in equal quarterly installments at the end of each quarter, and that the standard annual valuation date is the last day of the trust year, December 31. It is irrelevant if the trust is initiated and funded on another date during the year creating a short trust year, as this initial short trust year is not used to determine the period from the standard annual valuation date to the first periodic payment each year. In addition, we assume that the unitrust interest involved is to be valued at the IRC Section 7520 interest rate of 3.2%. Time periods are rounded to the nearest whole number of months. Based on these facts, the adjusted payout rate is 4.903 percent, determined as:

$$\text{Applicable Section 7520 Interest Rate} = 3.2\%$$

$$\text{Quarterly Payout Adjustment Factor, Table F(3.2)} = 0.980544$$

(First payment made at least 3 months but less than 4 months from annual valuation)

$$\text{Stated Annual Payout Percentage} = 5.0\%$$

$$\text{Adjusted Payout Rate} = 5.0\% \times 0.980544$$

$$= 4.903\%$$

It is standard to state the adjusted payout rate to 3 decimal places when expressed as a percentage (e.g., 4.903 percent), or to 5 decimal places when expressed as a simple decimal figure, (e.g., 0.04903, which is equivalent to 4.903 percent). The taxpayer may elect to use more decimal places for the adjusted payout rate, but not fewer, and must use the same method consistently in valuing all interests in the same property.

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## B. Single Life Remainder Interest

**Example 2.** On August 15, a person who is nearest to age 57 contributes \$1,500,000 to a charitable remainder unitrust. The trust pays to him the lesser of 5.0% per year of the annually computed value of the trust assets, or the trust net income, paid in equal quarterly installments at the end of each calendar quarter. After his death, the trust distributes the remaining corpus to a qualified charity.

Under IRC Section 7520, if a charitable contribution is allowed for a transfer of property to the trust, the taxpayer may elect to use either the IRC Section 7520 rate for the month of transfer or the rate for either of the two preceding months. We assume the taxpayer elects to use the rate for the month of transfer, 3.2%.

The trust pays the lesser of the stated payout rate of 5.0% or the trust net income. Under the provisions of Federal Income Tax Regulations Section 1.664-4(a)(3), we compute the remainder interest based on the trust's stated payout rate of 5.0%. Using the method illustrated in Example 1 above, the adjusted payout rate is found to be 4.903%. The desired remainder factor may be found by using the remainder factors found in Table U(1) for adjusted payout rates immediately above and below this adjusted payout rate and interpolating between these factors for the remainder factor at the adjusted payout rate of 4.903%.

$$\begin{array}{r} \text{Remainder Factor, Table U(1), at 4.8\%} = 0.32758 \\ \text{minus Remainder Factor, Table U(1), at 5.0\%} = 0.31430 \\ \hline \text{Difference} = 0.01328 \end{array}$$

$$\begin{array}{r} 4.903\% - 4.8\% \quad \quad X \\ \hline 5.0\% - 4.8\% \quad \quad 0.01328 \\ X = 0.00684 \end{array}$$

$$\begin{array}{r} \text{Remainder Factor at 4.8\%} = 0.32758 \\ \text{minus } X = 0.00684 \\ \hline \text{Required Interpolated Remainder Factor at 4.903\%} = 0.32074 \end{array}$$

$$\begin{array}{r} \text{times Initial Trust Corpus Value} = \$1,500,000 \\ \hline \text{Present Value of Remainder Interest} = \$481,110 \end{array}$$

As an alternative to using an interpolation method, for both this example and the examples below, it is also acceptable to compute the remainder factor directly from the underlying actuarial formulas using an adjusted payout rate of 4.903%, provided that the resulting remainder factor is expressed to at least 5 decimal places, and that this method is applied consistently in valuing all interests in the same property.

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## C. Two Life Last-to-Die Factor

**Example 3.** On March 25, a person who is nearest to age 75 contributes \$800,000 to a charitable remainder unitrust. The trust pays him 5.0% per year of the annually computed value of the trust assets, paid in equal quarterly installments at the end of each quarter. After his death, the trust makes the same payments to his wife (nearest to age 70) if she is then living, for the time she survives him.

Under IRC Section 7520, if a charitable contribution is allowed for a transfer of property to the trust, the taxpayer may elect to use either the IRC Section 7520 rate for the month of transfer or the rate for either of the two preceding months. We assume the taxpayer elects to use a month for which the IRC Section 7520 rate is 3.2%.

Using the same method as illustrated in Example 1 above, the adjusted payout rate is 4.903%. The desired remainder factor may be found by using the remainder factors found in Table U(2) for adjusted payout rates immediately above and below this adjusted payout rate and interpolating between these factors for the remainder factor at the adjusted payout rate of 4.903%.

$$\begin{array}{r} \text{Remainder Factor, Table U(2), at 4.8\%} = 0.43046 \\ \text{minus Remainder Factor, Table U(2), at 5.0\%} = 0.41613 \\ \hline \text{Difference} = 0.01433 \end{array}$$

$$\begin{array}{r} 4.903\% - 4.8\% \quad X \\ \hline 5.0\% - 4.8\% \quad 0.01433 \\ X = 0.00738 \end{array}$$

$$\begin{array}{r} \text{Remainder Factor at 4.8\%} = 0.43046 \\ \text{minus } X = 0.00738 \\ \hline \text{Required Interpolated Remainder Factor at 4.903\%} = 0.42308 \end{array}$$

$$\begin{array}{r} \text{times Initial Trust Corpus Value} = \$800,000 \\ \hline \text{Present Value of Remainder Interest} = \$338,464 \end{array}$$

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## D. Trust for Term Certain

**Example 4.** On July 1, a person contributes \$5,000,000 to a charitable lead unitrust. The trustee pays to a qualified charitable organization 5.0% per year of the annually computed value of the trust assets, paid in equal quarterly installments at the end of each quarter. The trustee is to continue making these payments for 15 years. At the end of the 15 years, after all the required charitable payments have been made, the trustee distributes the remaining trust assets to the donor.

Under IRC Section 7520, if a charitable contribution is allowed for a transfer of property to the trust, the taxpayer may elect to use either the IRC Section 7520 rate for the month of transfer or the rate for either of the two preceding months. We assume the taxpayer elects to use the rate for a month in which the IRC Section 7520 rate is 3.2%.

Using the same method as illustrated in Example 1, the adjusted payout rate is 4.903%. The desired remainder factor may be found by using the remainder factors found in Table D for adjusted payout rates immediately above and below this adjusted payout rate and interpolating between these factors for the remainder factor at the adjusted payout rate of 4.903%.

$$\begin{array}{r} \text{Remainder Factor, Table D, at 4.8\%} = 0.478139 \\ \text{minus Remainder Factor, Table D, at 5.0\%} = 0.463291 \\ \hline \text{Difference} = 0.014848 \end{array}$$

$$\begin{array}{r} 4.903\% - 4.8\% \quad X \\ \hline 5.0\% - 4.8\% \quad 0.014848 \end{array} = \frac{\quad}{\quad}$$

$$X = 0.007647$$

$$\begin{array}{r} \text{Remainder Factor at 4.8\%} = 0.478139 \\ \text{minus } X = 0.007647 \\ \hline \text{Required Interpolated Remainder Factor at 4.816\%} = 0.470492 \end{array}$$

$$\begin{array}{r} \text{times Initial Trust Corpus Value} = \$5,000,000 \\ \hline \text{Present Value of Remainder Interest} = \$2,352,460 \end{array}$$

$$\begin{array}{r} \text{Present Value of the Charitable Lead Interest} = \$5,000,000 - \$2,352,460 \\ = \$2,647,540 \end{array}$$

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## E. Factors Involving One Life and a Term of Years

**Example 5.** On July 1, a person transfers \$900,000 to a Grantor's Retained Unitrust which pays 5.0% per year in equal quarterly installments at the end of each quarter for 10 years or until the prior death of the grantor, who is nearest to age 60. The IRC Section 7520 interest rate for July is 3.2%. To determine the present value of the grantor's retained interest in the trust by interpolation, it will be necessary to perform two computations and interpolate between the two results to get the desired factor at the adjusted payout rate of 4.903%.

### First Computation:

$$\begin{aligned} \text{Payout Rate} &= 4.8\% \\ \text{Equivalent Interest Rate Factor at 4.8\% Payout Rate} &= \frac{4.8\% / (1 - 4.8\%)}{0.05042} \end{aligned}$$

$$\begin{aligned} \text{Initial age} &= 60 \\ \text{plus Term of years} &= 10 \\ \hline \text{Terminal age} &= 70 \end{aligned}$$

$$\begin{aligned} \text{N-factor, Table Z (4.8), age 60} &= 58,509.09 \\ \text{minus N-factor, Table Z (4.8), age 70} &= 24,541.74 \\ \hline \text{Difference} &= 33,967.35 \end{aligned}$$

$${}^u\text{D}_x, \text{ Table Z (4.8)} = 4,634.189$$

$$\begin{aligned} \text{Payout Accumulation Factor at 4.8 \%} &= 33,967.35 / 4,634.189 \\ &= 7.32973 \\ \text{times Equivalent Interest Rate Factor at 4.8 \%} &= 0.05042 \\ \hline \text{First Payout Interest Factor, at 4.8\% Payout Rate} &= 0.36956 \end{aligned}$$

### Second Computation:

$$\begin{aligned} \text{Payout Rate} &= 5.0\% \\ \text{Using the same method as above, compute:} & \\ \text{Second Payout Interest Factor at 5\% Payout Rate} &= 0.38174 \end{aligned}$$

Using the interpolation method shown in Example 2, interpolate between the Second Payout Interest Factor of 0.38174 and the First Payout Interest Factor of 0.36956:

$$\text{Required Interpolated Payout Interest Factor at 4.903\%} = 0.37583$$

$$\begin{aligned} \text{times Initial Trust Corpus Value} &= \$900,000 \\ \text{Present Value of Grantor's Retained Interest} &= \$338,247 \end{aligned}$$

