

TIME VALUE MONEY - TIMELINE VISUALIZATION & SHORT EXPLANATION © tvmtmln.doc
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Time Value Money (TVM) problems, also known as Present and Future Value problems, are where cash is received or paid at various times with the goal being to restate all the cash flows into one particular time period equivalency. Our basic assumption is that cash today can be invested and as a result will grow to a larger sum later (future value problems). Therefore the reverse is also assumed. Cash at later dates is equal to the cash invested earlier plus interest, therefore, in order to restate the future cash flows into earlier cash equivalents the interest portion must be taken out (present value problems).

Timeline visualization:		<u>n=3 i=10%</u> <u>table factor</u>	<u>table factor</u> <u>is always</u>
FvAmt	<div style="display: flex; justify-content: space-between; align-items: center;"> 1000 <div style="flex-grow: 1; border-bottom: 1px dashed black; position: relative;"> ? </div> </div>	1.3310	> 1.000
FvAo	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="flex-grow: 1; border-bottom: 1px dashed black; position: relative;"> ? </div> </div>	3.3100	> number of rents
PvAmt	<div style="display: flex; justify-content: space-between; align-items: center;"> ? <div style="flex-grow: 1; border-bottom: 1px dashed black; position: relative;"> </div> </div>	.7513	< 1.0000
PvAo	<div style="display: flex; justify-content: space-between; align-items: center;"> ? <div style="flex-grow: 1; border-bottom: 1px dashed black; position: relative;"> </div> </div>	2.4869	< number of rents

Legend of acronyms and symbols used:

Fv = future value	n = number of time periods
Pv = present value	i = interest/discount rate per time period
Amt = amount	r = rent/annuity payment per period
Ao = ordinary annuity	? = represents the point in time that you want to know how much.
Ad = annuity due	

Comparison of an Ordinary Annuity (Ao) and an Annuity Due (Ad) of 4 rents at \$25 per period:

Ao	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="flex-grow: 1; border-bottom: 1px dashed black; position: relative;"> </div> </div>
Ad	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="flex-grow: 1; border-bottom: 1px dashed black; position: relative;"> </div> </div>

Note the future value of an annuity has only 3 periods which it can earn interest whereas the future value of an annuity due has 4 interest earning periods. Also note the present value of an ordinary annuity has all 4 rents discounted whereas the annuity due has only 3 rents discounted. We will not discuss or calculate annuity due problems, only ordinary annuity problems.