What is the net present value of a project that costs ${X} now and pays out ${Y} {N} years from now, assuming an interest rate of {r}%? Write your answer with 2 decimal places.

X in (100,1000,100), Y in (100,1000,100), N in (10,25,1), r in (1,15,1)

{Y}/(1+{r}/100)^{N} - {X}

Explanation: Calculate the NPV of each part separately, and then add them together. The cash outflow is simple -1 times its amount. The cash inflow is calculated as CF/(1+r)^N, where CF is the cash flow amount, r is the interest rate, and N is the number of years.

What is the net present value of a project that costs ${X} now and pays out ${Y} per year for the next {N} years, assuming an interest rate of {r}%? Write your answer with 2 decimal places.

X in (1000,2000,100), Y in (100,500,100), N in (10,25,1), r in (1,15,1)

{Y}\*100/{r} \* (1-1/(1+{r}/100)^{N}) - {X}

Explanation: Calculate the NPV of each part separately, and then add them together. The cash outflow is simple -1 times its amount. The cash inflow is an annuity, so you can use the annuity formula, CF/r \* [1-1/(1+r)^N].

What is the net present value of a project that costs ${X} now and pays out ${Y} per year for the next {N} years along with paying back the original ${X} in the final year, assuming an interest rate of {r}%? Write your answer with 2 decimal places.

X in (100,1000,100), Y in (100,1000,100), N in (10,25,1), r in (1,15,1)

{Y}\*100/{r} \* (1-1/(1+{r}/100)^{N}) - {X} + {X}/(1+{r}/100)^{N}

Explanation: Calculate the NPV of each part separately, and then add them together. The cash outflow is simple -1 times its amount. The first cash inflow is an annuity, so you can use the annuity formula, CF/r \* [1-1/(1+r)^N]. The second cash flow, being paid back the original outflow, can be calculated as CF/(1+r)^N.

What is the net present value of a {X} dollar note receivable (loaning out {X} now) where the recipient pays back the full amount plus interest 1 year later at an annual rate of {r}%. Assume the interest rate is also {r}%.

X in {1000,10000,1000}, N in {2,12,2}, r in {3,18,3}

({X}+{r}/100\*{X})/(1+{r}/100)-{X}

Explanation: Long way: Calculate the NPV of each part separately, and then add them together. The cash outflow is simple -1 times its amount. The total amount paid back will be the original amount, CF, plus the interest payment of CF\*r. Then, we discount this amount by (1+r).

Short way: Since our discount rate and interest rate are the same, the cash inflow’s NPV is the same as the original amount, CF. Since we are loaning out CF at the beginning, the full NPV is CF - CF = 0.

What is the net present value of a {X} dollar note receivable (loaning out {X} now) where the recipient pays back the full amount plus interest 1 year later at an annual rate of {i}%. Assume the interest rate for discounting is {r}%.

X in {1000,10000,1000}, N in {2,12,2}, r in {12,18,3}, i in {3,9,3}

({X}+{i}/100\*{X})/(1+{r}/100)-{X}

Explanation: Calculate the NPV of each part separately, and then add them together. The cash outflow is simple -1 times its amount. The total amount paid back will be the original amount, CF, plus the interest payment of CF\*i, where i is the annual rate paid on the note. Then, we discount this amount by (1+r), where r is the interest rate for discounting.

Note that since i<r, we get a negative NPV.

What is the net present value of a {X} dollar note receivable (loaning out {X} now) where the recipient pays back the full amount plus interest 1 year later at an annual rate of {i}%. Assume the interest rate for discounting is {r}%.

X in {1000,10000,1000}, N in {2,12,2}, r in {3,9,3}, i in {12,18,3}

({X}+{i}/100\*{X})/(1+{r}/100)-{X}

Explanation: Calculate the NPV of each part separately, and then add them together. The cash outflow is simple -1 times its amount. The total amount paid back will be the original amount, CF, plus the interest payment of CF\*i, where i is the annual rate paid on the note. Then, we discount this amount by (1+r), where r is the interest rate for discounting.

Note that since i>r, we get a positive NPV.