A table with numbers and numbers

Description automatically generatedA company has four projects for the evaluation using the cash flow estimates. The relevant information of the four projects is shown in the following table. Negative values represent expenditure and positive values indicate income. Please answer the following questions with explanations according to the given information.

1. Assuming a 10% discount rate, calculate the net present value for each of the four projects, and decide which, on the basis of this criterion, is the most beneficial to pursue. Note: Please keep two decimals for the value of the discount factor in calculations.

Solution:

*CFt*​ = Cash flow in year t

r = Discount rate

t = Year

Given:

r = 10% or 0.10

**Project A:**  
NPVA=−10000×(1+0.10)0+−1000×(1+0.10)1+−1000×(1+0.10)2+−1000×(1+0.10)3+−2000×(1+0.10)4+10000×(1+0.10)5**= -7643.67**

**Project B:**  
NPVB=−100000×(1+0.10)0+20000×(1+0.10)1+20000×(1+0.10)2+20000×(1+0.10)3+20000×(1+0.10)4+30000×(1+0.10)5**=-17975.05**

**Project C:**  
NPVC=−10000×(1+0.10)0+3000×(1+0.10)1+3000×(1+0.10)2+3000×(1+0.10)3+3000×(1+0.10)4+3000×(1+0.10)5**=1372.36**

**Project D:**  
NPVD=−12000×(1+0.10)0+3000×(1+0.10)1+3000×(1+0.10)2+3000×(1+0.10)3+3000×(1+0.10)4+7500×(1+0.10)5**=2166.51**

2. Analyze the payback period for each of the four projects, and decide which, on the basis of this criterion, is the most beneficial to pursue.

**Project A:**  
NPVA=−10000×(1+0.10)0+−1000×(1+0.10)1+−1000×(1+0.10)2+−1000×(1+0.10)3+−2000×(1+0.10)4+10000×(1+0.10)5*NPVA*​=−10000×(1+0.10)0+−1000×(1+0.10)1+−1000×(1+0.10)2+−1000×(1+0.10)3+−2000×(1+0.10)4+10000×(1+0.10)5

**Project B:**  
NPVB=−100000×(1+0.10)0+20000×(1+0.10)1+20000×(1+0.10)2+20000×(1+0.10)3+20000×(1+0.10)4+30000×(1+0.10)5*NPVB*​=−100000×(1+0.10)0+20000×(1+0.10)1+20000×(1+0.10)2+20000×(1+0.10)3+20000×(1+0.10)4+30000×(1+0.10)5

**Project C:**  
NPVC=−10000×(1+0.10)0+3000×(1+0.10)1+3000×(1+0.10)2+3000×(1+0.10)3+3000×(1+0.10)4+3000×(1+0.10)5*NPVC*​=−10000×(1+0.10)0+3000×(1+0.10)1+3000×(1+0.10)2+3000×(1+0.10)3+3000×(1+0.10)4+3000×(1+0.10)5

**Project D:**  
NPVD=−12000×(1+0.10)0+3000×(1+0.10)1+3000×(1+0.10)2+3000×(1+0.10)3+3000×(1+0.10)4+7500×(1+0.10)5*NPVD*​=−12000×(1+0.10)0+3000×(1+0.10)1+3000×(1+0.10)2+3000×(1+0.10)3+3000×(1+0.10)4+7500×(1+0.10)5

下面是计算结果：

**Project A:**  
NPV\_A = -10000 + (-1000/1.10) + (-1000/1.21) + (-1000/1.33) + (-2000/1.46) + (10000/1.61)  
NPV\_A = -10000 - 909.09 - 826.45 - 751.31 - 1369.86 + 6209.21  
NPV\_A = -3647.50

**Project B:**  
NPV\_B = -100000 + (20000/1.10) + (20000/1.21) + (20000/1.33) + (20000/1.46) + (30000/1.61)  
NPV\_B = -100000 + 18181.82 + 16528.93 + 15037.59 + 13698.63 + 18634.78  
NPV\_B = -2618.25

**Project C:**  
NPV\_C = -10000 + (3000/1.10) + (3000/1.21) + (3000/1.33) + (3000/1.46) + (3000/1.61)  
NPV\_C = -10000 + 2727.27 + 2479.34 + 2252.25 + 2054.79 + 1863.35  
NPV\_C = -6122.30

**Project D:**  
NPV\_D = -12000 + (3000/1.10) + (3000/1.21) + (3000/1.33) + (3000/1.46) + (7500/1.61)  
NPV\_D = -12000 + 2727.27 + 2479.34 + 2252.25 + 2054.79 + 4664.60  
NPV\_D = -3821.75