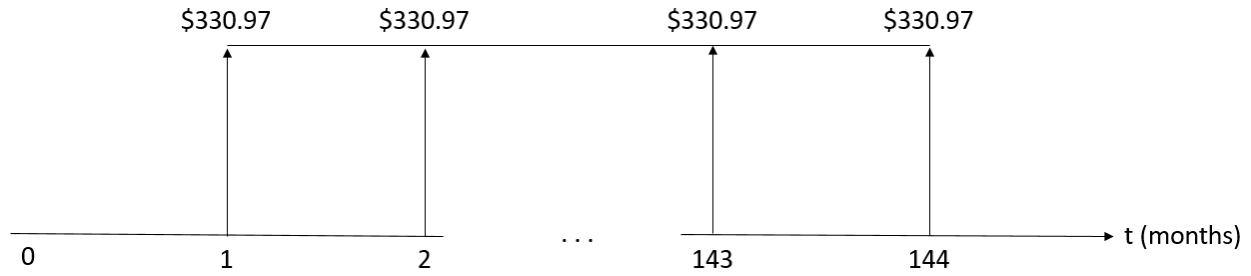


1 Question 1



$$r = 12\%$$

$$i = \frac{r}{m} = \frac{12\%}{12} = 1\%/\text{month} = 0.01$$

$$n = 12 \text{ years} = 144 \text{ months}$$

$$F = (21,000)(4) + (1,800)(12) = 105,600$$

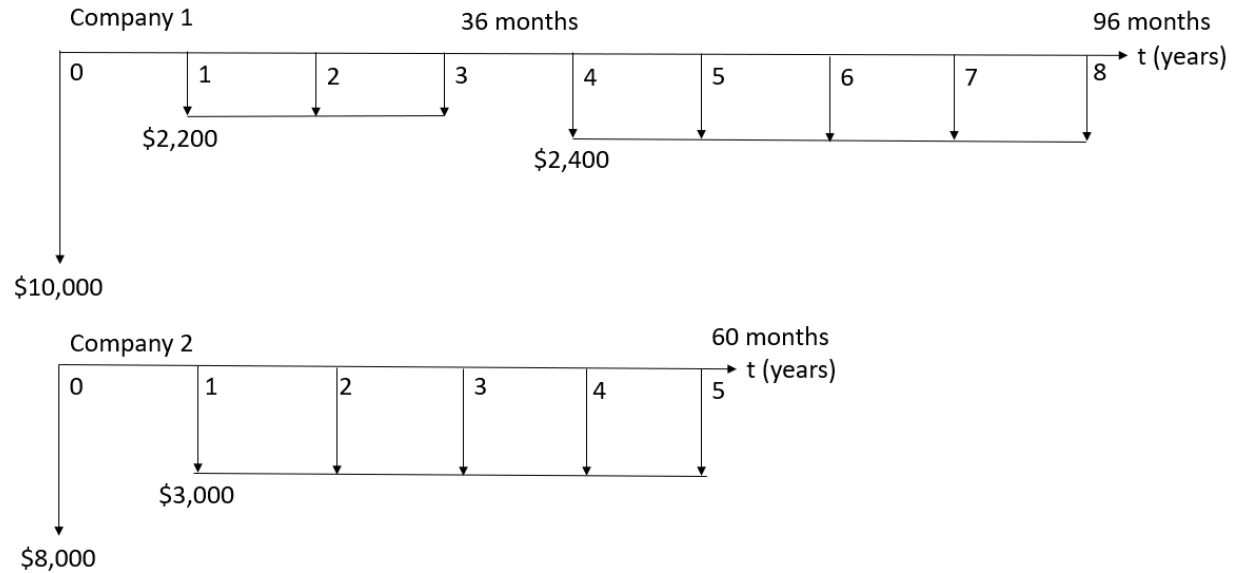
$$F = A(F/A, 1\%, 144)$$

$$A = \frac{F}{((1+i)^n - 1)/i} = \frac{105,600}{((1+0.01)^{144} - 1)/0.01}$$

$$A = \$330.97$$

He should save \$330.97 at the end of each month to cover the tuition and housing.

2 Question 2



$$r = 15\%$$

$$i = \frac{r}{m} = \frac{15\%}{12} = 1.25\%$$

$$LCM = 40$$

$$PW_1 = 10,000 + 2,200 \left(\frac{1.0125^{36} - 1}{0.0125(1.0125)^{36}} \right) + 2400 \left(\frac{1.0125^{60} - 1}{0.0125(1.0125)^{60}} \right) \left(\frac{1}{1.0125^{36}} \right)$$

$$PW_1 = 137,968.68$$

$$A_1 = 137,968.68 \left(\frac{0.0125(1.0125)^{96}}{1.0125^{96} - 1} \right) = 2,475.90$$

$$P_1 = 2,475.90 \left(\frac{1.0125^{480} - 1}{0.0125(1.0125)^{480}} \right) = \$197,562.43$$

$$PW_2 = 8,000 + 3,000 \left(\frac{1.0125^{60} - 1}{0.0125(1.0125)^{60}} \right)$$

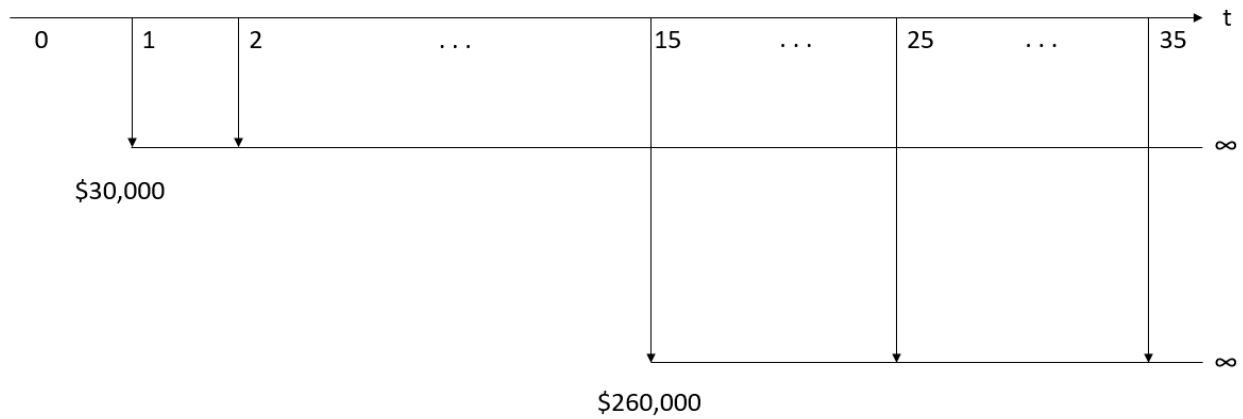
$$PW_2 = 134,103.78$$

$$A_2 = 134,103.78 \left(\frac{0.0125(1.0125)^{60}}{1.0125^{60} - 1} \right) = 3,190.32$$

$$P_2 = 3,190.32 \left(\frac{1.0125^{480} - 1}{0.0125(1.0125)^{480}} \right) = \$254,568.99$$

$P_1 < P_2$, so Company 1 has the better offer.

3 Question 3



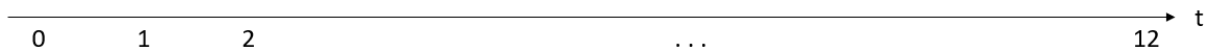
$$PW = \frac{30,000}{0.15} + 260,000 \left(\frac{0.15}{1.15^{10} - 1} \right) \left(\frac{1}{0.15} \right) \left(\frac{1}{1.15^5} \right)$$

$$PW = \$242,444.10$$

The present worth of this maintenance plan is \$242,444.10.

4 Question 4

Option 1



Option 2

\$1,000



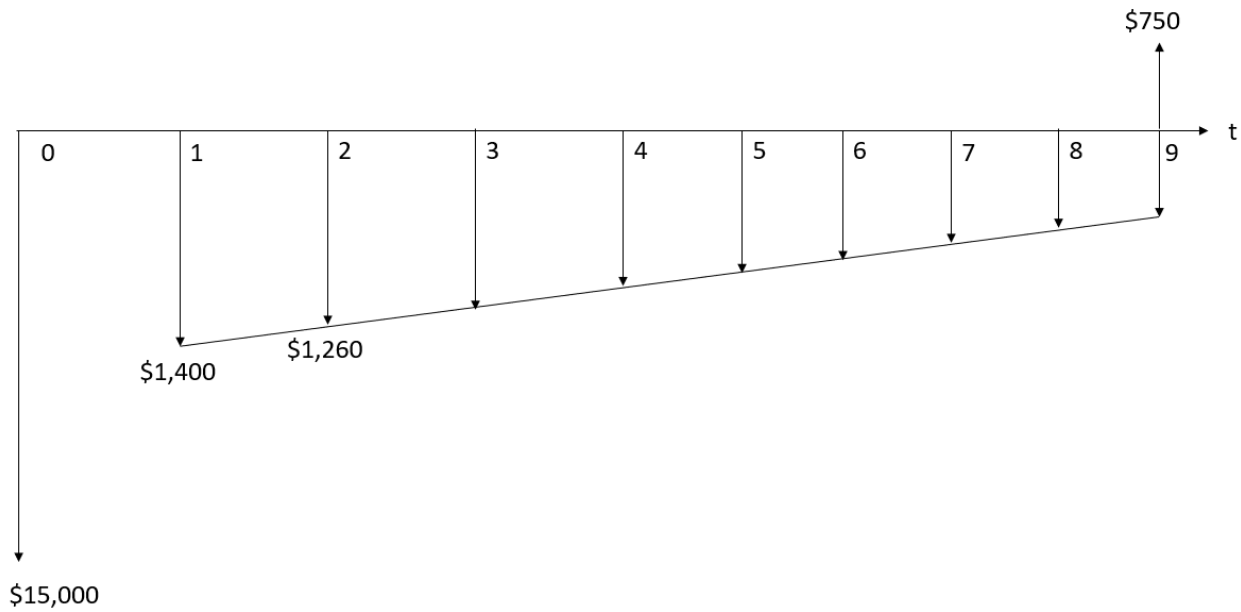
$$i = 10\%/year = 0.833\%/month$$

$$PW_1 = 0 \text{ (no costs)}$$

$$PW_2 = 1000 - 100 \left(\frac{1.00833^{12} - 1}{0.00833(1.00833)^{12}} \right) = -\$137.47$$

Option 1 is more beneficial for him at the end of the year because he does not need to spend any money, unlike in Option 2, where he needs to spend \$137.47.

5 Question 5



$$i = 12\%/year$$

$$g = -0.1 \text{ (10\% decrease per year)}$$

$$i^o = \frac{1 + 0.12}{1 - 0.1} - 1$$

$$i^o = 0.2444$$

$$PW = -15,000 + \frac{750}{(1 + 0.12)^9} - 1,400 \left(\frac{(1 + 0.2444)^9 - 1}{(0.2444)(1.2444)^9} \right) \left(\frac{1}{1 - 0.1} \right)$$

$$PW = -\$20,204.84$$

The present worth of purchase and maintenance cost with an interest rate of 12% is $-\$20,204.84$.