7-56

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **X** | **Y** | **(X – Y)** |
| 0 | −$5,000 | −$5,000 | $0 |
| 1 | −$3,000 | +$2,000 | −$5,000 |
| 2 | +$4,000 | +$2,000 | +$2,000 |
| 3 | +$4,000 | +$2,000 | +$2,000 |
| 4 | +$4,000 | +$2,000 | +$2,000 |
| Computed ROR | 16.9% | 21.9% | 9.7% |

Since X – Y difference between alternatives is desirable, select Alternative X.

7-58

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| Alt. A | -12000 |  |  |  |  |  |  |  | 1200 |
| Alt. B | -3000 | -3000 | -3000 | -3000 | -3000 | -3000 | -3000 | -3000 |  |
| A-B | -9000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 1200 |

IRR of A  B stream = IRR (the A – B values for the Years 0–8) = 27.90%

Since ΔROR > MARR (15%), choose the higher initial cost alternative, A (purchasing the equipment).

7-64

(a) Salvage = $50,000 and community’s interest rate = 8%.

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Purchase** | **Lease** | **Purchase –**  **Lease** |
| 0 | –$480,000 | –$70,000 | –$410,000 |
| 1 | 0 | –70,000 | 70,000 |
| 2 | 0 | –70,000 | 70,000 |
| 3 | 0 | –70,000 | 70,000 |
| 4 | 0 | –70,000 | 70,000 |
| 5 | 0 | –70,000 | 70,000 |
| 6 | 0 | –70,000 | 70,000 |
| 7 | 0 | –70,000 | 70,000 |
| 8 | 0 | –70,000 | 70,000 |
| 9 | 0 | –70,000 | 70,000 |
| 10 | 50,000 | 0 | 50,000 |

NPW = 0 = −410,000 +70,000 (*P*/*A*, IRR , 9) + 50,000 (*P*/*A*, IRR, 10) and interpolating

IRR = 10% + (2%) = 10.74% (10.71% Excel). The IRR is above the community’s interest rate on the borrowed amount ($410,000) from leasing, so buy the generator.



(b) The community spends $80,000 less on fuel and maintenance than it spends on buying power.

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Purchase** | **Lease** | **Purchase –**  **Lease** |
| 0 | –$480,000 | –$70,000 | –$410,000 |
| 1 | 80,000 | –70,000 | 150,000 |
| 2 | 80,000 | –70,000 | 150,000 |
| 3 | 80,000 | –70,000 | 150,000 |
| 4 | 80,000 | –70,000 | 150,000 |
| 5 | 80,000 | –70,000 | 150,000 |
| 6 | 80,000 | –70,000 | 150,000 |
| 7 | 80,000 | –70,000 | 150,000 |
| 8 | 80,000 | –70,000 | 150,000 |
| 9 | 80,000 | –70,000 | 150,000 |
| 10 | 80,000  50,000 | 0 | 130,000 |

NPW = 0 = −410,000 + 150,000 (*P*/*A*, IRR, 9) + 130,000 (*P*/*F*, IRR, 10) and interpolating

IRR = 30% + (5%) = 34.66% (34.63% from Excel). The interest rate on the borrowed amount is now well above the firm’s interest rate, so buy the generator. The rate of return for the generator will clearly be largest for this cash flow and is given by



PW = 0 = −480,000 + 80,000 (*P*/*A*, ROR, 10) + 50,000 (*P*/*F*, ROR, 10) and interpolating

ROR = 10% + (2%) = 11.44% (11.42% from Excel).



7-68

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **A** | **B** | **A – B** |
| 0 | −$150 | −$100 | −$50 |
| 1–10 | +$25 | +$22.25 | +$2.75 |
| 11–15 | +$25 | $0 | +$25 |
| 15 | +$20 | $0 | +$20 |
| Computed ROR | 14.8% | 18% | 11.6% |

Rate of Return (A – B):

$50 = $2.75 (*P*/*A*, *i*%, 10) + $25 (*P*/*A*, *i*%, 5) (*P*/*F*, *i*%, 10) + $20 (*P*/*F*, *i*%, 15)

Rate of Return = 11.65

Select A.