Problem 6.1

Figure 1: Known Values

Project	Interest Rate (pct)	Initial Investment ($)	Profit, Year 1 ($/yr)	Profit, Year 2 ($/yr)	Profit, Year 3 ($/yr)	Profit, Year 4 ($/yr)	Profit, Year 5 ($/yr)
A	10%	$500,000.00	$150,000.00	$200,000.00	$250,000.00	$150,000.00	$100,000.00
B	10%	$300,000.00	$50,000.00	$150,000.00	$200,000.00	$300,000.00	$200,000.00

Figure 2: Net Present Value

Project	Present Investment ($)	Value ($, Year 1)	Value ($, Year 2)	Value ($, Year 3)	Value ($, Year 4)	Value ($, Year 5)	Cost Recovery ($)	NPV ($)
A	-$500,000.00	$136,363.64	$165,289.26	$187,828.70	$102,452.02	$62,092.13	$0.00	$154,025.74
B	-$300,000.00	$45,454.55	$123,966.94	$150,262.96	$204,904.04	$124,184.26	$0.00	$348,772.75

Notes:

Net present value was calculated using equation 6.5 provided in the textbook.

Present Investment is computed by multiplying the initial investment in Figure 1, by `-1`.

The value in year x was calculated using equation 6.5 provided in the textbook.

For this analysis, it was assumed that the salvage value at the end of the project was zero for both projects.

Figure 3: Payback Period

Project	Initial Investment ($)	Average Cash Flow ($/yr)	PB (years)
A	$500,000.00	$170,000.00	2.941
B	$300,000.00	$180,000.00	1.667

Notes:

Payback period was calculated using equation 6.9 provided in the textbook.

Figure 4: Internal Rate of Return

Project	Present Investment ($)	Profit, Year 1 ($/yr)	Profit, Year 2 ($/yr)	Profit, Year 3 ($/yr)	Profit, Year 4 ($/yr)	Profit, Year 5 ($/yr)	IRR (pct)
A	-$500,000.00	$150,000.00	$200,000.00	$250,000.00	$150,000.00	$100,000.00	22%
B	-$300,000.00	$50,000.00	$150,000.00	$200,000.00	$300,000.00	$200,000.00	40%

Notes:

Internal Rate of Return calculated using equation 6.7 provided in the textbook and was computed using the `IRR` function in google sheets and rounded to a whole number.

Present Investment is computed by multiplying the initial investment by `-1`.

Figure 5: Profitability Index

Project	Value, Year 1 ($/yr)	Value, Year 2 ($/yr)	Value, Year 3 ($/yr)	Value, Year 4 ($/yr)	Value, Year 5 ($/yr)	PI (unitless)	Prefered Project
A	$122,979.12	$134,434.34	$137,771.80	$67,772.22	$37,042.52	1.00	
B	$40,993.04	$100,825.75	$110,217.44	$135,544.44	$74,085.05	1.54	**B**

Notes:

Profitability index calculated using equation 6.10 provided in the textbook.

The IRR used for Project A is 22% and the IRR used for Project B is 40%, as computed in Figure 4.

Problem 6.7

Known Values

Make	Cost	MPG (miles/gal)	Maintenance (pct)	Fuel ($/gal)	Term (yrs)	Use (miles/yr)	Resale (pct)	Interest (pct)
Toyota	$28,000.00	50	0.5%	$2.00	5	10,000	40%	6%
GM	$24,000.00	25	0.5%	$2.00	5	10,000	30%	6%

Annual Costs

Make	Fuel ($/yr)	Maintenance ($/yr)	Total ($/yr)
Toyota	$400.00	$140.00	$540.00
GM	$800.00	$120.00	$920.00

Salvage

Make	Total Cost ($/yr)
Toyota	$11,200.00
GM	$7,200.00

Annual Costs

Make	Investment ($, P)	Useful Life (yrs, N)	Salvage Value ($, L)	Interest Rate (pct, *i*)	Annual Expense ($/yr, AE)	Annual Cost ($/yr, AC)
Toyota	$28,000.00	5	$11,200.00	6%	$540.00	$2,973.24
GM	$24,000.00	5	$7,200.00	6%	$920.00	$3,113.24

Notes:

Annual cost calculated using Formula 6.2 in the textbook.