

# ICA 8: Vehicle Costing

ISE 453: Design of PLS Systems

Fall 2018

This ICA has an auto example on the front and one question on the back that you can submit.

UberX Rates (<https://uberestimator.com/cities/raleigh>):

- \$5 minimum or non-refundable cancellation fee
- \$1.00 base fare + \$2.50 service fee
- 14 cents per minute
- 76 cents per mile

IRS: Beginning on Jan. 1, 2018, the standard mileage rates for the use of a car (or van, pickup, panel truck) will be:

- 54.5 cents per mile for business miles driven
- 18 cents per mile driven for medical or moving purposes
- 14 cents per mile driven in service of charitable organizations

Interest Rate		Annual	(Monthly)	(Mo x 12)	Source (accessed 9/24/2018)
Prime Rate		5.00%			<a href="http://www.forecasts.org/prime.htm">http://www.forecasts.org/prime.htm</a>
Increase over Prime		2.00%			
Nominal Interest Rate		7.00%			
Current Inflation Rate		2.70%			<a href="http://www.forecasts.org/inflation.htm">http://www.forecasts.org/inflation.htm</a>
Real Interest Rate	( $i$ )	4.30%	0.36%		
<b>Car Loan</b>					
Economic Life	( $N$ , yr)	5	60		
Investment Cost	( $IV$ , \$)	25,000	25,000		
Salvage Percentage		0%	0%		
Salvage Value	( $SV$ , \$)	0	0		
Effective Investment Cost	( $IV^{eff}$ , \$)	25,000	25,000		
Cost Cap Recovery	( $K$ , \$/yr)	5,663	464	5,566	
<b>Lease</b>					
Economic Life	( $N$ , yr)	5	60		
Investment Cost	( $IV$ , \$)	25,000	25,000		
Salvage Percentage		30%	30%		
Salvage Value	( $SV$ , \$)	7,500	7,500		
Effective Investment Cost	( $IV^{eff}$ , \$)	18,924	18,949		
Cost Cap Recovery	( $K$ , \$/yr)	4,287	352	4,218	
<b>Costing</b>					
Annual Mileage	(mi/yr)	12,000	1,000		
Fuel Efficiency	(mi/gal)	25.0	25.0		
Fuel Cost per Gallon	(\$/gal)	2.844	2.844		<a href="https://www.eia.gov/petroleum/gasdiesel/">https://www.eia.gov/petroleum/gasdiesel/</a>
Fuel Cost	(\$/mi)	0.11376	0.11376		
Annual Fuel Cost	(\$/yr)	1,365	114		
Tire, Repair, Insurance	(\$/yr)	1,200	100		
Operating Cost	(\$/yr)	2,565	214		
Operating Cost per Unit	(\$/mi)	0.21	0.21		
Annual Investment Cost	(\$/yr)	4,287	352		
Cost per Mile	(\$/mi)	0.36	0.35		
Total Annual Cost	(\$/yr)	6,852	565		
Cost per Mile	(\$/mi)	0.57	0.57		

**Question.** Estimate the *Cost per Mile* for a tractor-trailer using the following information:

<b>Interest Rate</b>		<b>Annual</b>
Prime Rate		5.00%
Increase over Prime		2.00%
Nominal Interest Rate		
Current Inflation Rate		2.70%
Real Interest Rate	( $i$ )	
<b>Lease</b>		
Economic Life	( $N$ , yr)	7.25
Investment Cost	( $IV$ , \$)	175,000
Salvage Percentage		30%
Salvage Value	( $SV$ , \$)	
Effective Investment Cost	( $IV^{\text{eff}}$ , \$)	
Cost Cap Recovery	( $K$ , \$/yr)	
<b>Costing</b>		
Annual Mileage	(mi/yr)	103,945
Fuel Efficiency	(mi/gal)	5.8
Fuel Cost per Gallon	(\$/gal)	3.270
Fuel Cost	(\$/mi)	0.5637931
Annual Fuel Cost	(\$/yr)	58,603
Tire,Repair,Insurance	(\$/yr)	77,044
Driver Salary with Benefits	(\$/yr)	64,757
Operating Cost	(\$/yr)	200,405
Operating Cost per Unit	(\$/mi)	1.93
Annual Investment Cost	(\$/yr)	
Cost per Mile	(\$/mi)	
Total Annual Cost	(\$/yr)	
Cost per Mile	(\$/mi)	
<b>Target Costing</b>		
TL Rev per loaded tr-mi	(\$/mi)	2.6991
Percent Empty Travel		0.15
Percent Operating Profit		0.05
TL Cost per mi	(\$/mi)	2.18