

SUV Insurance

You work for an automobile insurance company. Your boss has assigned you the task of reviewing recent SUV insurance records and thinking about how that information may be relevant to your company. You found these data on the web.

HIGHWAY LOSS DATA INSTITUTE (www.hwysafety.org) OVERALL INSURANCE LOSSES (2005-07)

SMALL SUVS		MID-SIZE SUVS				LARGE SUVS	
Model	Rating	Model	Rating	Model	Rating	Model	Rating
CR-V 4WD	71	Rendezvous	65	Liberty 4WD	87	Sequoia 4WD	79
Escape 4WD	72	Freestyle 4WD	69	Pacifica	89	Sequoia	87
Forester 4WD	72	Freestyle	70	Murano 4WD	89	Tahoe 4WD	90
CR-V	73	Pilot 4WD	70	Envoy	91	Yukon 4WD	94
Vue 4WD	73	Pilot	73	Grand Cherokee 4WD	91	Commander 4WD	94
Mariner 4WD	74	Highlander 4WD	73	Sorento 4WD	91	Pathfinder	95
Tucson 4WD	81	Explorer 4WD	74	Pathfinder	91	Armada 4WD	95
Vue	82	4Runner 4WD	75	Murano	92	Touareg 4WD	99
Equinox 4WD	83	Xterra 4WD	76	FJ Cruiser 4WD	95	Yukon	103
Sportage 4WD	83	Wrangler 4WD	77	CX-7	96	Commander	103
Mariner	83	Highlander	78	Xterra	97	Pathfinder	106
Escape	85	Envoy 4WD	79	Highlander Hybrid	97	Armada	106
Escape Hyb. 4WD	85	Santa Fe	82	TrailBlazer	98	Tahoe	107
Element 4WD	85	Tribeca 4WD	82	Sorento	98	Durango 4WD	107
Torrent	85	TrailBlazer 4WD	85	Hummer H3 4WD	106	Durango	122
RAV4 4WD	85	Explorer	85	Endeavor 4WD	108		
RAV4	86	4Runner	85	Grand Cherokee	110		
Escape Hybrid	88	Highlander Hyb. 4WD	85	Liberty	110		
Tucson	89	Pathfinder 4WD	86	Endeavor	114		
Sportage	91	Pacifica 4WD	87				
Equinox	97						
Element	98						
Grand Vitara	119						

Insurance loss results are stated in relative terms. 100 represents average result for all cars. Lower numbers are better. For example, a rating of 122 means insurance losses 22% worse than average.

Write a report to your boss, including:

- appropriate comparative plots and summary statistics;
- descriptions of the loss ratings for each group of SUVs;
- a comparison of loss ratings for the three sizes of SUVs;
- your recommendation to your boss about your company's insurance policies.

	Components	Comments
Think	Demonstrates clear understanding of statistical concepts and techniques in comparing the three distributions	
Show	<ul style="list-style-type: none"> ○ uses parallel boxplots ○ has consistent scale (any kind of graphs) ○ graphs are correct and clearly labeled ○ 5 # summaries and IQR's are correct 	
Tell	<p>Compares centers:</p> <ul style="list-style-type: none"> ○ numerically (probably medians) ○ compares groups to each other ○ compares each group to average (100) ○ discusses all three groups <p>Compares variability:</p> <ul style="list-style-type: none"> ○ notes differences in IQR's ○ correctly interprets those differences ○ notes outlier ○ notes that groups overlap (ex: ??% of small SUVs have losses lower than median of large) <p>States conclusion:</p> <ul style="list-style-type: none"> ○ in context (W's, insurance co. memo) ○ interprets the ratings properly ○ makes a recommendation ○ avoids speculation (drivers, accidents, etc) 	

4 Components are scored as **Essentially correct**, **Partially correct**, or **Incorrect**

1: Graph Boxplots, on the same scale, clearly labeled with correct numerical summaries.

E – All four requirements. P – Only 2 or 3. I – Fewer than 2

2: Compare the centers Correctly compares all three groups to each other and to the overall average (100), with proper use of numerical summaries (medians).

E – All four requirements. P – Only 2 or 3. I – Fewer than 2

3: Compare the spreads Compares variability within groups (IQRs), noting consistently lower losses in small SUVs and consistently higher losses in large SUVs. Notes outlier. Discusses overlap between groups, probably using medians and quartiles.

E – All four requirements. P – Only 2 or 3. I – Fewer than 2

4: General conclusion Clearly written, in the proper context, the general conclusion correctly interprets the ratings and recommends some course of action (perhaps lower premiums for small SUVs).

E – All four requirements. P – Only 2 or 3. I – Fewer than 2

Scoring:

- E's count 1 point, P's are 1/2
- AP Score = sum of components; rounding based on quality of "Partial" responses.
- Grade: A = 4, B = 3, etc., with +/- based on rounding (ex: 3.5 rounded to 3 is a B+)

Name _____ AP Score _____ Grade _____