

Below is a pre-and post-test used in 2007 that includes a 10-item attitude survey. The pre-tests were given during the first week of the semester and the post-tests were given during the last week. Students were awarded bonus credit based on their scores (number correct out of 15) on the two testings. The first table gives the mean of the percents correct on the 15 pre-test items for the three student populations. Following that are the 15 items, the number of students choosing options A through E, the mean number of correct answers (15 possible) of the students choosing the various options, and the pre- and post-test mean percents correct of the three student populations. The last listing contains the 10 items of the attitude survey along with the pre- and post- means of the attitude item responses.

PRE-TEST

% correct	item 1	item 2	item 3	item 4	item 5	item 6	item 7	item 8	item 9	item 10	item 11	item 12	item 13	item 14	item 15
QRCW	57.1	18.8	82.1	61.6	96.4	46.4	58.9	77.7	84.8	43.8	60.7	22.3	46.4	49.1	66.1
FAPP	65.6	21.9	89.6	63.5	99.0	42.7	77.1	75.0	86.5	50.0	60.4	27.1	42.7	62.5	76.0
SURV	59.5	26.4	86.5	65.0	98.8	60.1	77.3	84.0	87.7	50.3	48.5	36.2	51.5	64.4	84.0

N for option is the number of students who chose that option.  
 Mn score is the mean score on the test without this question of the scores of students who chose this option.  
 Correct choice is **boldface**.  
 FAPP indicates students in a course taught using the book *For All Practical Purposes* as a textbook.  
 SURV indicates students in a 3-hour survey of calculus course for business students.  
 QRCW and FAPP are options for arts and humanities students while almost all SURV students are business majors.

1. On the daily weather map below the same isobar passes through St. Louis and Minneapolis. Which of the following can be concluded from this?



- A. St. Louis and Minneapolis have the same temperature.
- B. St. Louis and Minneapolis have the same barometric pressure.
- C. St. Louis and Minneapolis have the same latitude.
- D. St. Louis and Minneapolis have the same relative humidity.
- E. St. Louis and Minneapolis have the same elevation above sea level.

Option	N for Option	Mn Score	QRCW	FAPP	SURV	PRE	POST
A	42	8.17				55.56	78.13
B	<b>224</b>	<b>9.06</b>				62.50	62.34
C	23	7.54				57.55	66.98
D	42	8.33					
E	35	9.06					
% correct	60.4						

2. The Fall 2007 enrollment at the University of Arkansas was 18,200, and this was an increase of 4% over the Fall 2006 enrollment was:

- A. 17,472
- B. 17,500
- C. 17,800
- D. 18,900
- E. 18,958

Option	N for option	Mn score	QRCW	FAPP	SURV	PRE	POST
A	181	9.43					
B	<b>83</b>	<b>9.67</b>				15.87	40.63
C	83	7.93				18.75	35.06
D	11	9.55				32.08	33.02
E	11	10.09					
% correct	22.4						

3. A McDonald's customer ordered a burger for 79¢, fries for \$1.19 and a coke for \$1.29. If the locality has a 5% sales tax, approximately what is the total bill?

- A. \$3.00
- B. \$3.10
- C. \$3.45
- D. \$4.00
- E. \$4.25

Option	N for option	Mn score	QRCW	FAPP	SURV	PRE	POST
A	3	7.00					
B	3	8.33				78.5	96.88
C	<b>319</b>	<b>8.69</b>				87.5	96.1
D	32	7.47				85.85	92.45
E	12	7.33					
% correct	86.0						

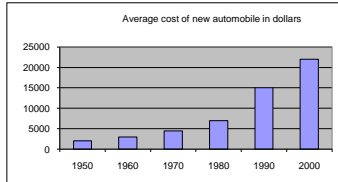
4. A credit card has a \$25 annual fee and charges 18% interest per year on the unpaid balance. If you average \$500 unpaid balance each month for a year, your total payment for use of the card for the year is:

- A. \$25.50
- B. \$32.50
- C. \$43.00
- D. \$90.00
- E. \$115.00

Option	N for option	Mn score	QRCW	FAPP	SURV	PRE	POST
A	6	7.00					
B	15	7.33				59.81	84.21
C	40	8.00				61.25	75.32
D	70	8.13				64.15	83.02
E	<b>236</b>	<b>9.16</b>					
% correct	63.6						

5. The graph below shows the average cost of a new automobile in the US for the given years. What is the approximate average cost in 1980?

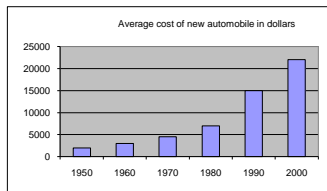
- A. \$2000 B. \$3000 C. \$4500 D. \$7000 E. \$22000



Option	N for option	Mn score	QRCW	FAPP	SURV	PRE	POST
A	1	6.00					
B	1	7.00				93.52	97.92
C	4	6.75				100	98.7
D	<b>364</b>	<b>8.42</b>				98.11	99.06
E	0	xxx					
% correct	98.1						

6. The graph below shows the average cost of a new automobile in the US for the given years. The approximate average cost in 1960 is what percent of the approximate average cost in 2000?

- A. 14% B. 20% C. 43% D. 73% E. 733%



Option	N for option	Mn score	QRCW	FAPP	SURV	PRE	POST
A	<b>191</b>	<b>9.69</b>					
B	73	8.18				47.12	60.87
C	18	8.50				41.25	71.43
D	49	7.22				56.6	74.53
E	28	8.43					
% correct	51.5						

7. A rectangular building measures 20 ft wide by 32 ft long. If it has a flat roof, which must be covered by plywood sheets measuring 4 ft by 8 ft, what is the least number of plywood sheets needed to cover the roof?

- A. 8
- B. 12
- C. 16
- D. 20
- E. 32

Option	N for option	Mn score	QRCW	FAPP	SURV	PRE	POST
A	36	7.58				58.88	82.11
B	23	7.78				77.5	76.62
C	29	7.79				74.53	91.51
D	<b>266</b>	<b>9.06</b>					
E	14	7.29					
% correct	71.7						

8. An automobile is traveling at 22 feet per second and accelerates at a rate of 2 feet per second per second for 5 seconds. At the end of the 5 seconds the

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car's speed is:

- A. 24 feet per second
- B. 27 feet per second
- C. 29 feet per second
- D. 30 feet per second
- E. 32 feet per second

Option	N for option	Mn score		PRE	POST
A	16	7.69			
B	14	7.79	QRCW	73.83	84.05
C	7	7.14	FAPP	75	74.03
D	36	7.81	SURV	83.02	89.62
E	<b>296</b>	<b>8.79</b>			
% correct		79.8			

9. The following gives the cost of a quart of milk for the years listed. A cost-of-milk index is established with a base of 100 in 1965. The value of the cost-of-milk index in 2005 is:

Year	Cost of a quart of milk	Index Value
1965	\$0.75	100
1975	\$1.20	
1985	\$1.50	200
2005	\$1.80	

A. 120 B. 150 C. 190 D. 240 E. 270

Option	N for option	Mn score		PRE	POST
A	5	7.60			
B	7	9.29	QRCW	84.8	93.55
C	7	8.00	FAPP	91.25	89.61
D	<b>321</b>	<b>8.61</b>	SURV	86.79	90.57
E	27	7.19			
% correct		86.5			

10. John pays \$50 for a calculator and Tina pays \$70 for a calculator. Which of the following correctly compares Tina's cost to John's cost?

- A. Tina's cost is 20% more than John's cost.
- B. John's cost is 40% less than Tina's cost.
- C. Tina's cost is 1.2 times John's cost.
- D. John's cost is 20% less than Tina's cost.
- E. Tina's cost is 1.4 times John's cost.

Option	N for option	Mn score		PRE	POST
A	55	7.76			
B	47	9.23	QRCW	47.12	60.87
C	50	8.70	FAPP	41.25	71.43
D	31	7.94	SURV	56.6	74.53
E	<b>179</b>	<b>9.43</b>			
% correct		48.2			

11. The participation rate of students in intramural athletics at Arkansas College was 44% in 1980 and 55% in 2000. Based on this information, which of the following is correct?

- A. The relative change in the participation rate is 11%.
- B. The increase in the participation rate is 11 percentage points.
- C. The increase in the participation rate is 20 percentage points.
- D. The relative change in the participation rate is 20%.
- E. The increase in the participation rate is 25 percentage points.

Option	N for option	Mn score		PRE	POST
A	133	8.54			
B	<b>205</b>	<b>9.10</b>	QRCW	59.26	77.08
C	5	8.60	FAPP	62.5	63.16
D	19	7.95	SURV	50	61.32
E	8	8.38			
% correct		55.3			

12. The length of a rectangle is between 2 feet and 2.5 feet and the width is between 6 inches and 9 inches. The area of the rectangle is:

- A. More than 1 square foot and less than 1.25 square feet
- B. Less than 2 square feet
- C. More than 1.25 square feet
- D. Less than 260 square inches
- E. More than 216 square inches

Option	N for option	Mn score		PRE	POST
A	55	8.64			
B	<b>110</b>	<b>9.48</b>	QRCW	24.04	25.81
C	84	8.50	FAPP	23.75	31.17
D	81	9.21	SURV	34.91	37.74
E	34	9.62			
% correct		29.6			

13. The population of Wyoming is 510,000 and the population of Arkansas is 2.4 million. Arkansas has 4 members of the US House of Representatives and 2 US Senators, while Wyoming has 1 member of the US House of Representatives and 2 US Senators. Based on this information, which of the following is not correct?

- A. Wyoming has one member of the US Congress for each 170,000 population.
- B. Arkansas has one member of the US Congress for each 400,000 population.
- C. Wyoming has one US Senator for each 255,000 population.
- D. Arkansas has one member of the US House of Representatives for each 600,000 population.
- E. Arkansas has one US Senator for each 1.4 million population.

Option	N for option	Mn score		PRE	POST
A	43	8.16			
B	28	8.61	QRCW	45.28	52.08
C	34	8.71	FAPP	40	55.41
D	82	8.35	SURV	50	58.47
E	<b>177</b>	<b>9.42</b>			
% correct		47.7			

14. The odds against the Red team winning a tournament are 3 to 1. This means that the Red team will win 1 time out of 4 or 25% of the time. If the odds against the Blue team winning the tournament are 7 to 2, which of the following is correct?

- A. The Blue team will win 2 times out of 7.
- B. The Blue team will win 2/7 of the time.
- C. The Blue team will win 2 times out of 9.
- D. The Blue team will win 7 times out of 9.
- E. The Blue team is more likely to win than the Red team.

Option	N for option	Mn score		PRE	POST
A	43	7.79			
B	8	7.88	QRCW	48.6	78.13
C	<b>220</b>	<b>9.14</b>	FAPP	61.5	57.3
D	48	8.60	SURV	64.15	65.09
E	47	8.23			
% correct		59.3			

15. John has the following test scores in his mathematics class: 68, 78, 80, 82, and 87. Which of the following is correct?

- A. The mean of John's test scores is 80.
- B. The median of John's test scores is 81.
- C. The median of John's test scores is 79.
- D. The mean of John's test scores is 79.
- E. The mean of John's test scores is 81.

Option	N for option	Mn score		PRE	POST
A	20	7.05			
B	16	7.00	QRCW	64.49	94.79
C	37	8.11	FAPP	76.25	92.21
D	<b>284</b>	<b>8.89</b>	SURV	84.91	94.34
E	12	7.92			
% correct		76.5			

Students were asked to choose a response that best describes their attitude on each item where 1 indicates strongly agree; 2 indicates agree; 3 indicates neutral; 4 indicates disagree; and 5 indicates strongly disagree.

1. I am good at mathematics.
2. I rarely use mathematics outside of school.
3. Mathematics is facts, rules, and formulas to be memorized.
4. I enjoy doing mathematics.
5. I want to learn more mathematics.
6. Estimating is part of doing mathematics.
7. Mathematics problems can be done correctly in only one way.
8. I rarely use mathematics in my other courses.
9. I am going to study more mathematics after this semester.
10. I expect to find mathematics important in my future occupation and everyday life.

Item No.	Means of the responses to the attitude items									
	1	2	3	4	5	6	7	8	9	10
QRCW PRE	3.46	3.19	2.75	3.87	3.05	2.26	3.95	2.65	3.88	2.69
QRCW POS	3.17	3.40	2.75	3.58	3.45	2.22	4.06	2.80	3.76	2.49
FAPP PRE	3.56	2.86	2.53	3.90	3.17	2.38	3.70	2.48	4.02	2.79
FAPP POST	3.30	2.96	2.63	3.64	3.69	2.37	4.03	2.66	4.04	2.88
SURV PRE	2.84	3.31	2.69	3.32	3.16	2.51	4.01	3.53	3.18	2.50
SURV POS	2.57	3.56	2.63	3.10	3.13	2.30	4.37	3.72	3.30	2.27