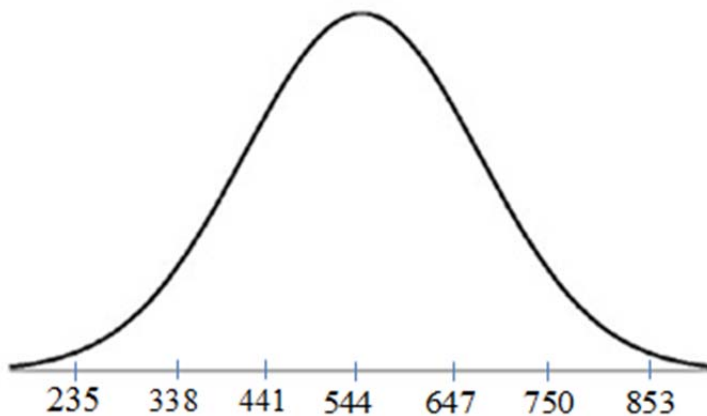


ALGEBRA II
2014–2015 PRACTICE MATERIALS KEY
UNIT 9
SEMESTER 2

#	Question Type	Unit	Common Core State Standard(s)	DOK Level	Key
1	MC	9	S.IC.B.3	1	A
2	MC	9	S.IC.B.3	1	C
3	MC	9	S.IC.B.3	1	B
4	MC	9	S.IC.B.3	1	C
5	MC	9	S.IC.B.3	1	C
6	MC	9	S.IC.B.3	1	D
7	MC	9	S.IC.B.3	1	A
8	MC	9	S.IC.B.3	1	D
9	MC	9	S.IC.B.3	1	B
10	MC	9	S.IC.B.5	1	C
11	MC	9	S.IC.B.5	1	B
12	MC	9	S.IC.B.3	1	D
13	MC	9	S.IC.A.1	1	D
14	MC	9	S.ID.A.1	1	B
15	MC	9	S.ID.A.1	1	B
16	MC	9	S.ID.A.4	1	D
17	MC	9	S.ID.A.4	1	C
18	MC	9	S.ID.A.4	1	B
19	MC	9	S.ID.A.4	1	C
20	MC	9	S.ID.A.4	1	D
21	MC	9	S.ID.A.4	1	B
22	MC	9	S.ID.A.4	2	C
23	MC	9	S.ID.A.4	1	B

24.

- (a) Make an accurate sketch of the distribution of these applicants' GRE scores. Be sure to provide a scale on a horizontal axis.



- (b) Use the 68-95-99.7 rule to find the proportion of applicants whose score is between 338 and 853.

853 is 3 standard deviations above 544, so 99.7/2 or 49.85% of the scores are between 544 and 853. 338 is 2 standard deviations below the 544, so 95/2 or 47.5% of the scores are between 338 and 544. Thus $49.85+47.5 = 97.35\%$ of the scores are between 338 and 853.

- (c) What proportion of GRE scores are below 500?

$$z = \frac{500 - 544}{103}$$

$$z = -0.43$$

0.3336 or 33.36% of the scores below 500

- (d) What proportion of GRE scores are above 800?

$$z = \frac{800 - 544}{103}$$

$$z = 2.49$$

0.0064 or .64% of the scores above 800

- (e) Calculate and interpret the 34th percentile of the distribution of applicants' GRE scores.

The 34th percentile corresponds to $z = -0.41$

$$-0.41 = \frac{x - 544}{103}$$

$$x = 502$$

So about 34% of the applicants have GRE scores below 502.

25.

- (a) Joe scores 1245 on the SAT. Assuming that both tests measure the same thing, what score on the ACT is equivalent to Jose's SAT score? Explain.

$$z = \frac{1245 - 1026}{209}$$

$$z = 1.05$$

$$1.05 = \frac{x - 20.9}{4.8}$$

$$x = 25.94$$

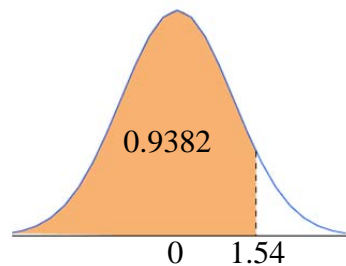
The equivalent score on the ACT is 25.94

- (b) Reports on a student's ACT or SAT usually give the percentile as well as the actual score. Terry scores 1342 on the SAT. What is her percentile? Show your method.

$$z = \frac{1342 - 1026}{209}$$

$$z = 1.54$$

Using the standard normal probabilities table
Terry is at the 94th percentile.



- (c) The quartiles of any distribution are the values with cumulative proportions 0.25 to 0.75. What are the quartiles of the distribution of ACT scores? Show your method.

25th percentile

$$z = -0.67$$

$$-0.67 = \frac{x - 20.9}{4.8}$$

$$x = 17.7$$

75th percentile

$$z = 0.67$$

$$0.67 = \frac{x - 20.9}{4.8}$$

$$x = 24.1$$

26.

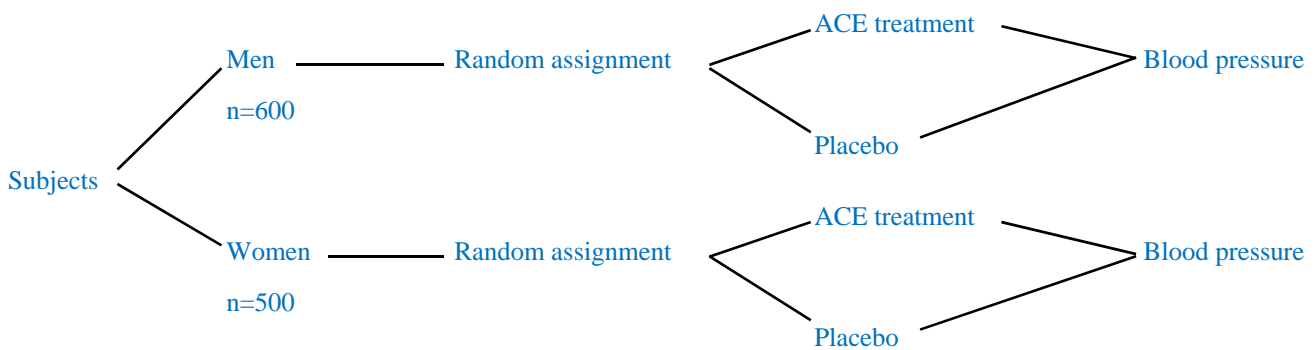
- (a) It is well known that men and women may react differently to common cardiovascular drug treatments. What sort of experimental design would you choose for this study, and why?

A randomized block design by gender to reduce the variability due to gender arising from a completely randomized design.

- (b) Explain why an experiment involving 600 men and 500 women is preferable to one involving 60 men and 50 women.

A larger number of subjects will decrease the impact of random variation on the results of the experiment.

- (c) Assume that 600 men and 500 women suffering from high blood pressure are available for the study. Describe a design for this experiment. Be sure to include a description of how you assign individuals to the treatment groups.



Within the block of men, assign numbers 001-600. Within the block of women, assign numbers 001-500. Choose three digit numbers from a random digit table until you have selected 300 men. Move to a different area of the table and repeat the process to select 250 women. These subjects will be in the ACE treatment group. All others will be in the control group.

27.

- (a) Explain why this is an experiment and not an observational study.

This is an experiment. Treatments are being imposed on the subjects.

- (b) Identify the explanatory and response variables.

Explanatory variable: vitamin E

Response variable: heart function

- (c) Identify the type of experimental design used in this study. Justify your answer.

This is a completely randomized design. All subjects are randomly assigned to a treatment group.

- (d) In the second sentence above is the phrase, "...the 14 patients who took vitamin E for two weeks before their operations had significantly better heart function after the procedure..." What is the statistical meaning of the word "significantly" in the context of this study?

"Significantly" means the differences in heart function between the groups is unlikely to have occurred by chance.

- (e) This was a controlled experiment. Describe how it was controlled and explain the purpose of doing so.

They are comparing a placebo group (control) to the vitamin E treatment group. This isolates the impact of the vitamin E on heart function.