ANSWERS TO MA 138 FINAL EXAM REVIEW PROBLEMS

1. a. P(OIL) = $\frac{1}{495}$

   b. P(PARTY) = $\frac{1}{55440}$

   c. P(no vowel in 4 tries) = $\frac{2401}{14641}$

2. a. P(two diamonds) = $\frac{4}{25}$

   b. P(3 then Jack) = $\frac{2}{25}$

   c. P(Jack then 3) = $\frac{2}{25}$

   d. P(not face card) = $\frac{9}{25}$

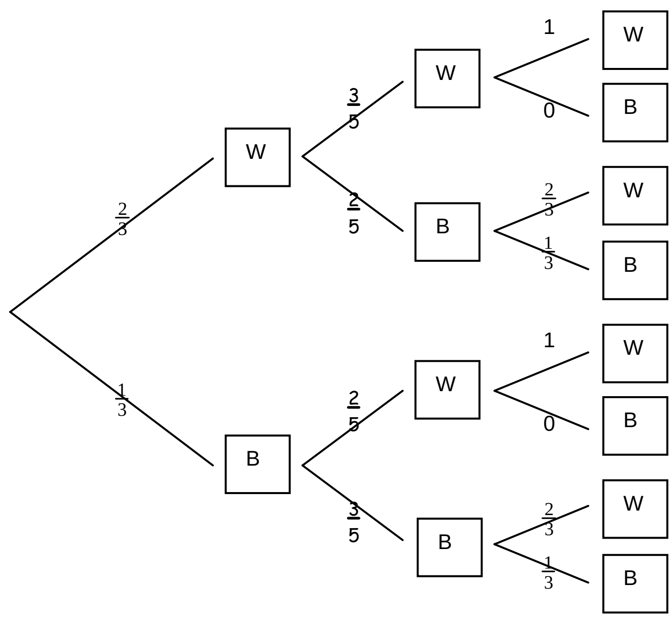
   e. P(3 then Jack) = P(Jack then 3) = $\frac{1}{10}$

3. a. P(2 black) = $\frac{6}{91}$

   b. P(2 white) = $\frac{4}{13}$

4. Yes the game is fair. Each player has a 1/2 probability of winning. You should show how you determined this!

5. a.



b. P(last letter is B) = $\frac{7}{45}$ c. P(last letter is W) = $\frac{38}{45}$

d. P(WBW) = $\frac{8}{45}$

6. Bill: \$34
   Bob: \$68
   Barb: \$83

7. a. $x < -5$ b. $x = 3$

8. a. $f(0) = -4$ $f(2) = 4$ $f(-1) = -2$
   b. No! If $f(x) = 5$, then $x^2 = 4.5$, which yields a value of x that is not in the listed domain.
   c. Yes! If $f(x) = 46$, then $x = 5$.

9. The trick works for any number. To prove it, you do the operations on a generic variable, and see what results: $\frac{2(n-3)+4}{2}+1=(n-3)+2+1=n-3+3=n$.

10. $C(m) = 1.75 + (0.50)(10m)$ or $C(m) = 1.75 + 5m$

11. The probability is $\frac{1}{287}$.

12. $\frac{1}{10{,}000}$

13. $\frac{1}{300}$

14. a. $\frac{2}{7}$ b. $\frac{1}{28}$

15. 16%

16. 0.778

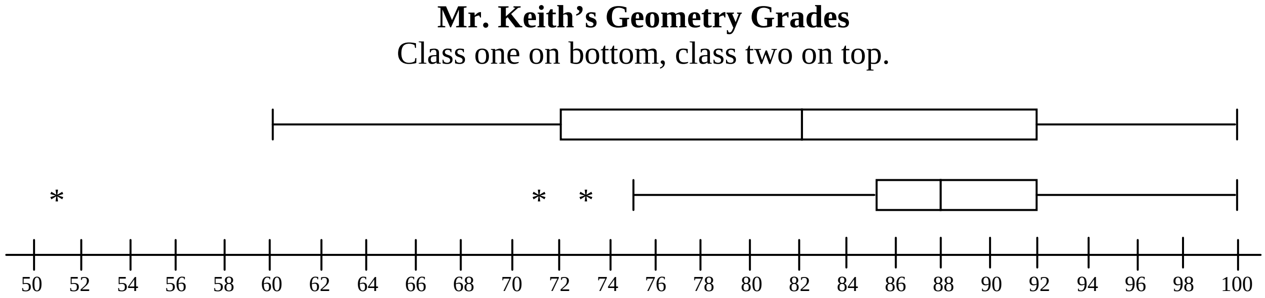
17. The call from Earhart has a z-score of 1.4, while the call from Windsor has a z-score of 0.44. So the call from Earhart should be considered more unusual.

18. 1174 or 1175, depending on how you round off.

19. 102

20. A z-score of 1.3 means she scored more than one standard deviation <u>above</u> the mean. Yet she thinks her score is below the mean. Not only is she wrong, she is VERY wrong!

21.



These plots show that class one did much better than class two. For example, the box for class one shows that fully 75% of the class scored better than the median score from class two. Class one's box also shows that the scores were clustered toward the higher end of the scale, while class two's scores were fairly evenly spread out from 60 to 100. The stem-and-leaf plot leads to the same conclusion, although the specific reasons are stated in a different way.

22. False, the percent increase is 20.96%. That's close to 20%, but actually a bit more, which could make a big difference if tuition is expensive.

23. No! Only if ALL costs rise 25% is the landlord justified in raising rent by that amount. A 25% increase in gas price does not mean a 25% increase in expense to the landlord, since gas is only one part of the expenses. For example, if gas totals 30% of the landlord's expense, then the increase in gas cost would mean an increase in total expense of 25% of 30% of the original total. That translates to 7.5% increase in total expense.

24. The mean score is 23 and the median is 27. The median is a better representation based on these six games.

25. The sections don't necessarily have the same number of students. If Anantha has more students, then their performance will push up the actual overall mean. If Danny has more students, then they will pull down the overall mean.

26. Any good measure of "average" should divide scores in half. So by definition, half of the students should score below average.

27. 79.4

28. a. $1.70
b. The man actually paid $17. He brings in $20, but $2 was his to begin with. So he really brings in $18, which means he gets $1 extra, *and* his dessert is paid for by his friends!

29. 20.

30. 93.3 lb.

31. \$906

32. 12%

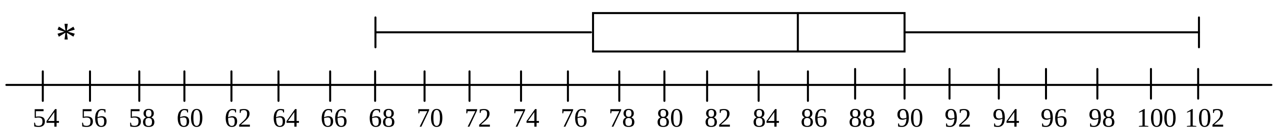
33. Jane's raise was 10.1%. Her raise was a smaller percent, even though it was more money.

34. $y = \frac{2}{3}x + \frac{10}{3}$

35. No, compare the *y*-intercepts.

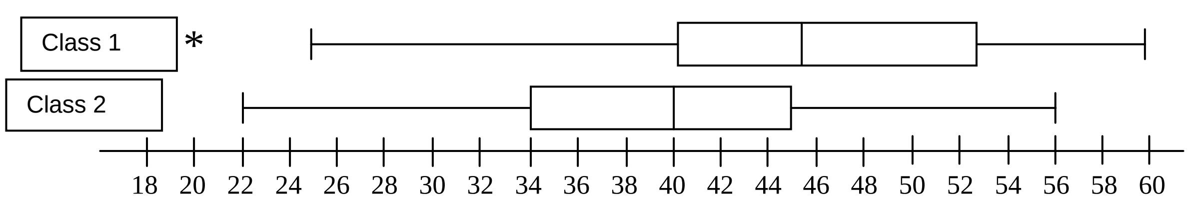
36. \$2.25 per pound

37. The median is 85.5, the lower quartile is 77, and the upper quartile is 90. The inner quartile range (IQR) is 90-77 = 13. 1.5 × IQR = 19.5. So any score below 57.5 or above 109.5 is an outlier.



38. <u>Class 1</u> median = 44.5, lower quartile = 39.5, upper quartile = 52, 1.5 × IQR = 18.75, outliers below 20.75 and above 70.75.

<u>Class 2</u> median = 40, lower quartile = 34, upper quartile = 45, 1.5 × IQR = 16.5, so outliers below 17.5 and above 61.5



Class 1 appears to have done better. Note that the upper quartile of class 2 is barely above the median of class 1. This means fully 50% of class 1 did as well or better than the top 25% of class 2.

39. Median = 42.5, lower quartile = 40, upper quartile = 47, 1.5 × IQR = 10.5, outliers below 29.5 and above 57.5