Lesson 3.2.1

3-44. $P(\text{DenA}) = 0.5 \cdot 0.5 \cdot 0.5 = 0.125$, $P(\text{DenB}) = 0.5 \cdot 0.5 + 0.5 \cdot 0.5 \cdot 0.5 = 0.375$, $P(\text{DenC}) = 0.5 \cdot 0.5 + 0.5 \cdot 0.5 = 0.50$

3-45. a. $0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 = 0.0625$

      b. $0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 = 0.0625$

      c. $P(\text{every event} - \text{HHHH}) = 1 - 0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 = 0.9375$
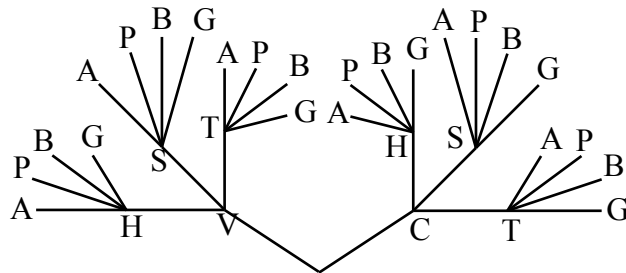
      d. 6 ways, thus the probability of flipping a coin four times and having T come up exactly two times is $\frac{6}{16} = \frac{3}{8} = 0.375$

      e. $2^{10} = 1024$

      f. $P(\text{HHHTHTHTTT}) = 0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 \cdot 0.5 = 0.000977$

3-46. $P(\text{DenA}) = (0.75)(0.75)(0.75) = 0.4229$, $P(\text{DenB}) = (0.75)(0.75)(0.25) + (0.75)(0.25) + (0.25)(0.75) = 0.5166$, $P(\text{DenC}) = (0.25)(0.25) = 0.0625$

3-47. a.

      b. 24 combinations. Count the number of branch ends at the right of the diagram.

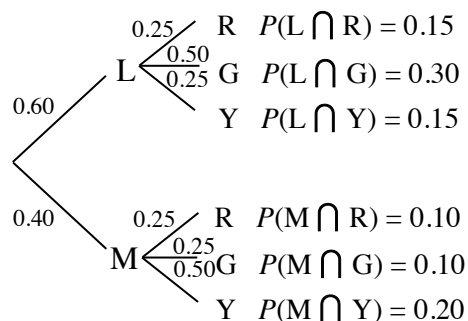   c. $\frac{6}{24} = \frac{1}{4} = 0.25 = 25\%$

      d. $\frac{8}{24} = \frac{1}{3} = 0.\overline{3} = 33\frac{1}{3}\%$

      e. Sister: VHA, VHP, VHB, VHG, CHA, CHP, CHB, CHG. Brother: VHG, VSG, VTG, CHG, CSG, CTG

      f. No, they have VHG and CHG in common.

      g. Answers vary, some possibilities are vanilla and chocolate, or berry and grape.

3-48. a. $P(L) = 0.6, P(M) = 0.4, P(R \mid L) = 0.25,$
$P(G \mid L) = 0.5, P(Y \mid L) = 0.25,$
$P(R \mid M) = 0.25, P(G \mid M) = 0.25,$
$P(Y \mid M) = 0.5$

      0.25   R $P(L \cap R) = 0.15$
      0.50
   L < 0.25   G $P(L \cap G) = 0.30$
0.60   Y $P(L \cap Y) = 0.15$

  0.40   0.25   R $P(M \cap R) = 0.10$
          0.25
       M < 0.50 G $P(M \cap G) = 0.10$
          Y $P(M \cap Y) = 0.20$

b. See tree diagram at right. See table below.

	R	G	Y	
L	0.15	0.30	0.15	$P(L) = 0.6$
M	0.10	0.10	0.20	$P(M) = 0.4$
	$P(R) = 0.25$	$P(G) = 0.40$	$P(Y) = 0.35$	

c. $P(L \cap Y) = 0.15$ or 15%

d. $P(M \mid R) = \frac{P(M \cap R)}{P(R)} = 0.40$ or 40%

3-49. a. This shows a strong, positive association, as measured by the positive slope and high value of R^2 (and therefore r), and the low S of 71 g relative to the range of values. The residual plot makes it clear the form is not linear. There are no visible outliers.

b. The y-intercept is –132, meaning that a box with 0 in^2 of cardboard would weigh –132 g. It would float away! This is obviously nonsensical.

Note: 2|1 means 21

3-50. a. The data is numerical (not a set of counts) so it is quantitative. It is recorded as discrete data. It looks as only whole number scores were possible.

b. See diagram at right.

c. Median = 89, Q1 = 63.5, Q3 = 99

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 3|3
 4|5
 5|
 6|0 7
 7|7
 8|4 9
 9|6 7 8
10|0 0 0
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3-51. a. Possible responses include: $0, 2\frac{1}{2}, 2\frac{1}{2}, 10, 10$ or $1, 2, 2, 10, 10$ or $1, 3, 7, 7, 7$

b. Possible responses include: $2, 2\frac{1}{2}, 2\frac{1}{2}, 10, 10$ or $1, 2\frac{1}{2}, 2\frac{1}{2}, 9, 10$

c. The sum of the numbers should be 25; the largest median to achieve that with is $7\frac{1}{2}$, using the list $0, 2\frac{1}{2}, 7\frac{1}{2}, 7\frac{1}{2}, 7\frac{1}{2}$.

3-52. a. Answers may vary but the boxplot at right is a reasonable representation based on shape and scale.

    390   590   790   990 1190 1390 1590
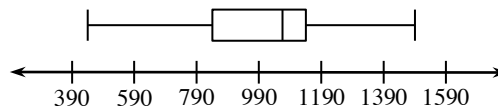
b. Like most measurements, the data is probably continuous. That is why it is displayed in a histogram instead of a dot plot.

 Statistics