1. $\frac{3}{2}$ Area under curve must be 1. Shape of curve is trapezoid. Area is $(\frac{1}{2})(\frac{16}{15} + (\frac{-8}{15}a + \frac{16}{15}))(a) = 1$. Expand to get $8a^2 - 32a + 30$. The two solutions are 3/2 and 5/2, but the latter is extraneous since it creates two separate areas that don't sum to 1.
2. 42 Data is 1, 3, 4, 6, 15, 17, 21, 24, 35, 43, 51, 75, 88. The median is 21. Q1 is the median of the first 6 terms, so it is (0.5 * (4 + 6)) = 5. Q3 is the median of the last 6 terms, so it is (0.5 * (43 + 51)) = 47. IQR = 47 – 5 = 42.
3. $\frac{\sqrt{6}}{50}$ Formula for standard error of a two-prop z-test is $\sqrt{(\hat{p})(1-\hat{p})\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}$ where $\hat{p} = \frac{x_1+x_2}{n_1+n_2}$. So $\hat{p} = \frac{70+90}{200+200} = 0.4, so\ SE = \sqrt{(0.4)(0.6)\left(\frac{1}{200}+\frac{1}{200}\right)} = \frac{\sqrt{6}}{50}$
4. 24 ORDINAL; , r, d, n, l; 4 consonants so 4! = 24
5. $\frac{5}{32}$ The first 3 heads must be achieved in the first 6 flips. So that is (6C3)$(0.5^3)(0.5^3)$. Finally, for the 7th flip, the probability of getting heads is 0.5. So, it is 20*(0.5^7), which simplifies to 5/32.
6. -68/5 or -13.6 Slope of the LSRL is $b = r * \frac{S_y}{S_x}$, which is (0.8)(7/5) which is 28/25. The point (30, 20) goes through the line, since it is the means of x and y. Plugging it in gets $20 = \frac{28}{25}(30) + y - int$. Solving for y-int gets $\frac{-68}{5}$.
7. 20 If everyone gets at least one, that takes away 4 pieces, so now there are 3 pieces left for four people. By stars and bars, the solution is $\binom{3+4-1}{3} = \binom{6}{3} = 20$.
8. 0.975 $54, 000 is two standard deviations away, so by empirical rule, 0.95 is the area between $46000 and $54000. So, all the area beneath $54000 is 0.95 + (0.05/2) = 0.975
9. 170 Data: 2, 3, 4, 6, 14, 17, 21, 22, 35, 43, 51, 68, 83. Q1 = 5, Q3 = 47, so IQR = 42. Low outliers are numbers < Q1 – 1.5*IQR so 5- 42(1.5) = -58. So, highest = -59. High outliers are numbers > Q3 + 1.5*IQR so 47 + 1.5(42) = 110. So, lowest = 111. Difference is 111 – (-59) = 170.
10. 0.05

	Female	Male	Total
Tennis	0.7*0.6 = 0.42	0.8 – 0.42 = .38	1 – 0.2 = 0.8
Golf	0.6 - 0.42 = .18	0.4 – 0.38 = 0.02	0.2
Total	0.6	1 – 0.6 = 0.4	1

So P(Golf | Male) = 0.02 / 0.4 = 0.05.

11. $\frac{2}{3}$ P(sum = prime OR sum = div of 12) = P(sum = prime) + P(sum = divisor of 12) – P(sum = prime AND div of 12). So, there are 15 ways to get a prime sum, 12 ways to get a sum that is a divisor of 12, AND 3 ways to get both (if the sum is 2 or 3). Total of 36 (6*6) possibilities. So, probability = (15 + 12 – 3)/36 = 2/3.
12. 21 4 levels of the medication (placebo, 5mg, 10mg, 15mg) and 3 levels of the tablets (1, 2, 3) so 4*3 = 12 treatments. 252/12 = 21 patients per treatment.
13. 4.8 Binomial distribution, mean = np, standard deviation = $\sqrt{npq}$. Mean = 16*0.2 = 3.2. SD = $\sqrt{16 * 0.2 * 0.8} = 1.6$. 3.2 + 1.6 = 4.8
14. 81 Set up a system of equations:

$\frac{93-\mu}{\sigma} = 3$ AND $\frac{66-\mu}{\sigma} = -1.5$, which can be rewritten to 93 – μ = 3σ, and 66 - μ = -1.5σ. Subtracting the second equation from the first gets 27 = 4.5σ. So, σ = 6, and plugging it back in, the mean is 75.

15. $\frac{25}{7}$ There are 15 ways for Dave to win: (D, M) = (2, 1), (3, 1), (4, 1), (5, 1), (6, 1), (3, 2), (4, 2), (5, 2), (6, 2), (4, 3), (5, 3), (6, 3), (5, 4), (6, 4), (6, 5). So, P(Dave) = 15/36. ($5)(15/36) = (D)($\frac{36-15}{36}$). D = $25/7

16. $8.50 P(Heart) = 13/52 = ¼. P(black) = 26/52 = ½. P(Queen of Diamonds) = 1/52. Exp Value = -$10(1) + $3(1/4) + $1(1/2) + $13(1/52) = -$8.50. Answer should be the absolute value, though, because question asks how much is expected loss.

17. 0.784 P(1 shot) = 0.4. P(2 shots) = (0.6)(0.4) = 0.24. P(3 shots) = (0.6)(0.6)(0.4) = 0.144. 0.144 + 0.24 + 0.4 = 0.784

18. 260 Var(2A – 2B) = $(2^2 * 4^2 = 64) + (2^2 * 7^2 = 196) = 260$

19. 64 $t = \frac{\bar{x}-\mu}{\frac{s}{\sqrt{n}}} = \frac{16-18}{\frac{4}{\sqrt{n}}} = -4$. So, $\sqrt{n} = 8, n = 64$.

20. 0.047 P(Type II) + Power = 1. So, 1 + P(Type I) = 1.047. P(Type I) = alpha level = 0.047.

21. 0.05 or 1/20

	A	A’	Total
B	P(A|B) * P(B) = 0.15	0.45 – 0.15 = 0.3	0.45
B’	0.65 – 0.15 = 0.5	0.55 – 0.5 = 0.05	1 – 0.45 = 0.55
Total	0.65	1 – 0.65 = 0.35	1

22. -4.5 or -9/2 Expected = 12.5(5) + 10 = 72.5. Residual = Obs – Exp = 68 – 72.5 = -4.5

23. 9 Point estimate = center of interval = 7. MOE = $\frac{9-5}{2} = 2$. 7 + 2 = 9.

24. A, B A- true by Central Limit Theorem. B- True by CLT. C- wrong, n should be greater than 30. D-incorrect, this is true because of the Central Limit Theorem.

25. 6 $t = \frac{b-0}{SE_b} = \frac{4.5}{SE_b} = 9$. So, SE = 0.5. With new test, t = $\frac{b-1.5}{SE_b} = \frac{3}{0.5} = 6$.