[105 FINAL REVIEW ANSWER KEY]

1. $1/7 = p(\text{ALL TAILS} \mid \text{1 TAILS})$

2. $p(\text{AT LEAST 1 HEADS}) = 7/8$

3. $\frac{13 \cdot 12 \cdot 11}{52 \cdot 51 \cdot 50} = 0.0129$

4. $p(\text{AT LEAST ONE} \heartsuit) = 1 - p(\text{NO} \heartsuit) = 1 - \left(\frac{39 \cdot 38 \cdot 37}{52 \cdot 51 \cdot 50}\right) = 0.586$

5. a. ORDER DOES NOT MATTER

   $\Rightarrow \frac{15 \cdot 14 \cdot 13}{3 \cdot 2 \cdot 1} = 455$

   ↳ THUS $p(\text{WIN}) = \frac{1}{455} = 0.0022$

   b. $4995\left(\frac{1}{455}\right) + (-5)\left(\frac{454}{455}\right) = \$5.99$

6. $\underset{P}{\underline{10}} \cdot \underset{VP}{\underline{9}} \cdot \underset{T}{\underline{8}} = 720$ (ORDER MATTERS)

7. $\frac{10 \cdot 9 \cdot 8}{3!} = 120$ (ORDER DOES NOT MATTER)

8. % OF PPL WHO THINK MARIO IS MORE ICONIC $= \frac{180}{250} = .72$

   MARGIN OF ERROR $= \pm \frac{1}{\sqrt{250}} = \pm 0.063$, THUS OUR 95% CONFIDENCE INTERVAL IS $(.657, .783)$

   $.72 - .063$ $.72 + .063$

9. MARGIN OF ERROR = $\pm \frac{1}{\sqrt{80}}$ = 0.112.

95% CONFIDENCE INTERVAL : (0.448, 0.672)

.56 − .448   .56 + .448

10. A 95% CONFIDENCE INTERVAL

11. THE INTERVAL WOULD BE (47%, 55%) - CAN'T BE SUPER CONFIDENT. CONTAINS VALUES ABOVE & BELOW 50%.

12.

	1^{ST} 10 MILES	2^{ND}	3^{RD}	
BOB	\$5	–	–	= \$5
MARY	\$5	+ \$7.50	–	= \$12.50
IVAN	\$5	+ \$7.50	+ \$15	= \$27.50

13. POSSIBLE 5-DIGIT COMBINATIONS = 10^5 = 100,000

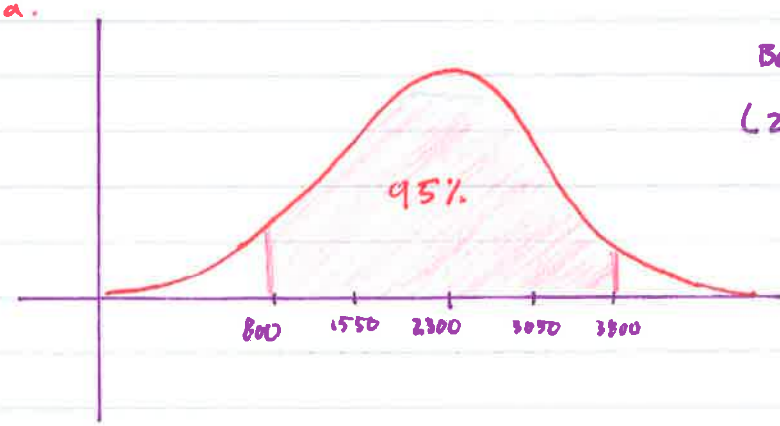
∴ IN 200 GUESSES, p(CORRECT GUESS) = $\frac{200}{100,000}$ = .002

14. a. p(1^{ST} IS WIN AND SECOND IS LOSE) = $\frac{3}{10} \times \frac{7}{9} = \frac{21}{90}$ = 0.23

b. p(AT LEAST 1 WIN) = 1 − p(NO WIN) = $1 - \left(\frac{7 \cdot 6 \cdot 5}{10 \cdot 9 \cdot 8}\right)$

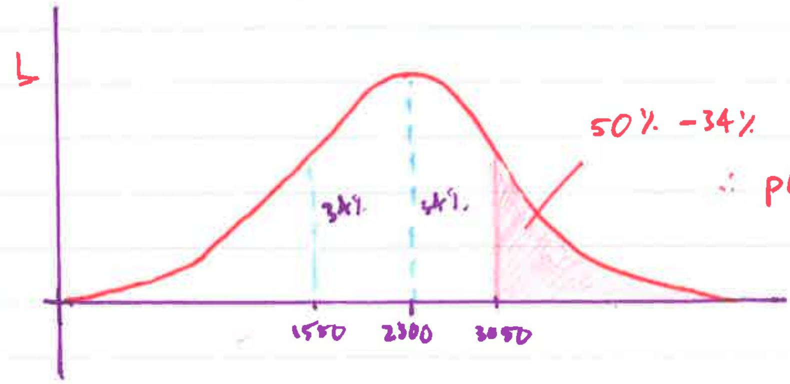
= 0.7083

15. a.



BETWEEN 800 & 3800 (2σ's AWAY FROM μ)

15. b



50% − 34% = 16%

∴ $p(> 3050) = .16$

c. YES.

$z = \frac{500 - 2300}{750} = -2.4$ STANDARD DEVIATIONS BELOW THE MEAN.

16. START BY FINDING HOW MANY GAMES THERE ARE IF EACH TEAM PLAYS EVERY OTHER TEAM JUST ONCE. (ORDER DOES NOT MATTER)

$\underset{1^{st}\text{ TEAM}}{7} \cdot \underset{2^{nd}\text{ TEAM}}{6} = 42 \Rightarrow \frac{42}{2 \cdot 1} = 21$ GAMES

$21 \times 3 = 62$ GAMES.

17. a. TABLE 3

b. T1 SCORE = (5)(.5) + (8)(.15) + (4)(.15) + (9)(.2) = 6.1

T2 SCORE = (4)(.5) + (4)(.15) + (7)(.15) + (6)(.2) = 7.35

T3 SCORE = (2)(.5) + (9)(.15) + (9)(.15) + (7)(.2) = 5.1

∴ TABLE 2

c. T1 SCORE = (5)(.25) + (8)(.4) + (9)(.1) + (9)(.25) = 7.1

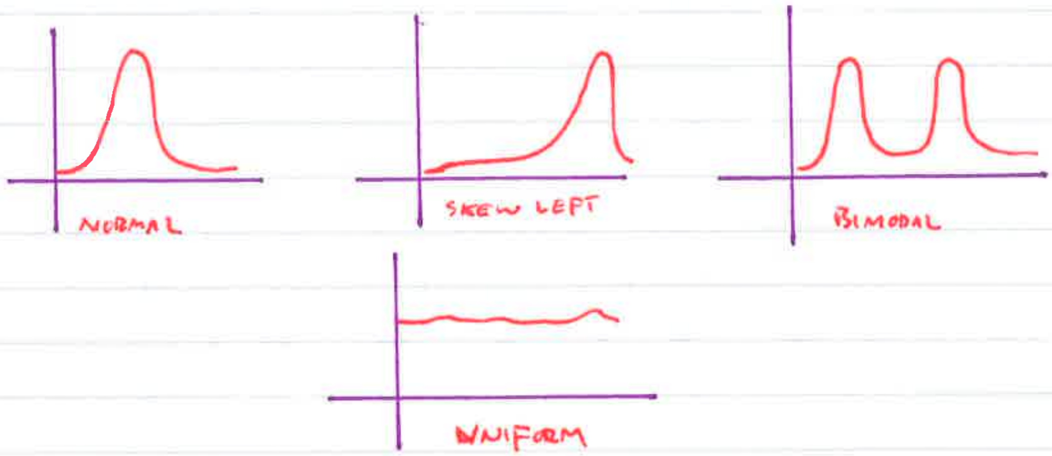
T2 SCORE = (9)(.25) + (4)(.4) + (7)(.1) + (6)(.25) ≈ 6.05

T3 SCORE = (2)(.25) + (9)(.4) + (9)(.1) + (7)(.25) = 6.75

∴ TABLE 1

18. ANSWERS WILL VARY. Ex: 0, 0, 0, 0, 0, 0, 0, 0, 0, 10, 10...

19.



20. NORMAL & UNIFORM.

21. 95% CONF. INT. FOR PPL WHO PREFER LEGOS (59%, 71%)

↳ ∴ LEGOS B/C 50% IS ~~[illegible]~~ OUTSIDE OF CONF. INT.

22. $\frac{1}{\sqrt{n}} = 0.03$

$1 = 0.03\sqrt{n}$

$\frac{1}{0.03} = \sqrt{n}$ → $n \approx 1112$ people

23. $\left(\frac{6}{36}\right)(10) + \left(\frac{18}{36}\right)(-2) + \left(\frac{12}{36}\right)(0) = \$0.67$

∴ NOT FAIR GAME.

24. $2000\left(1+\frac{.03}{12}\right)^{12\cdot 5} = \$2323.23$ $+323.23$

$4000\left(1+\frac{.04}{12}\right)^{12\cdot 5} = \$4883.99$ $= +883.99$

EARNED 560.76 MORE

25.

a) $$M = \frac{410{,}000\left(1+\frac{.035}{12}\right)^{180}\left(\frac{.035}{12}\right)}{\left(1+\frac{.035}{12}\right)^{180}-1} = \$2{,}931.02$$

OVERALL: $527,583.6

b) $$M = \frac{410{,}000\left(1+\frac{.043}{12}\right)^{360}\left(\frac{.043}{12}\right)}{\left(1+\frac{.043}{12}\right)^{360}-1} = \$2028.97$$

OVERALL: 730,424.2

26.

	"+"	"−"	TOTALS
CANCER	121.55	21.45	143
NO CANCER	642.75	214.25	857
TOTALS	764.3	235.7	1,000

$$p(\text{CANCER} \mid \text{"+"}) = \frac{121.55}{764.3} \approx .16$$