Exam 2 Answers

1. C
2. B
3. A
4. A
5. B
6. D
7. A
8. C
9. C
10. D
11. D
12. D
13. A
14. C
15. B
16. A
17. C
18. A
19. C
20. D
21. A
22. A
23. A
24. C
25. A
26. Assumption of linearity – the data points tend to cluster around a straight line. If this assumption is violated, the magnitude of the observed r will tend to be smaller than it should be. Assumption of non-truncated range – each variable has a sufficient amount of variability associated with it. If this assumption is violated, the magnitude of the observed r will tend to be smaller than it should be. The sample size is sufficiently large. If the sample size is too small, the magnitude of the observed r may be larger than it really is.
27. $z = \frac{X - \mu}{\sigma}$ z scores standardize a distribution of scores so that the mean of the distribution of z scores is 0 and the standard deviation of the distribution of z scores is 1. This allows us to compare values from two different distributions more easily.

28.

Like Cats		$Z_{\text{Like Cats}}$	Like Children	$Z_{\text{Like Children}}$	$Z_{\text{Cats}} \times Z_{\text{Children}}$
5		0.807573	7	1.470358	1.187422
4		0.269191	5	0.456318	0.122837
4		0.269191	6	0.963338	0.259322
2		-0.80757	5	0.456318	-0.36851
4		0.269191	3	-0.55772	-0.15013
1		-1.34595	1	-1.57176	2.115521
5		0.807573	4	-0.0507	-0.04095
1		-1.34595	1	-1.57176	2.115521
2		-0.80757	3	-0.55772	0.450401
7		1.884337	6	0.963338	1.815254
Σ	35		41		7.506688
mean	3.5		4.1		0.7506688
s	1.857418		1.972308		

$$r = \frac{\sum z_X z_Y}{N} = \frac{7.506688}{10} = .7506688$$

$$\text{slope} = r * s_{cats} / s_{children} = .7506688 * 1.857418 / 1.972308 = 0.7069411$$

$$\text{intercept} = \overline{Cats} - \text{slope} * \overline{Children} = 3.5 - 0.7069411 * 4.1 = 0.6015414$$

Cats' = 0.707 X Children + 0.602

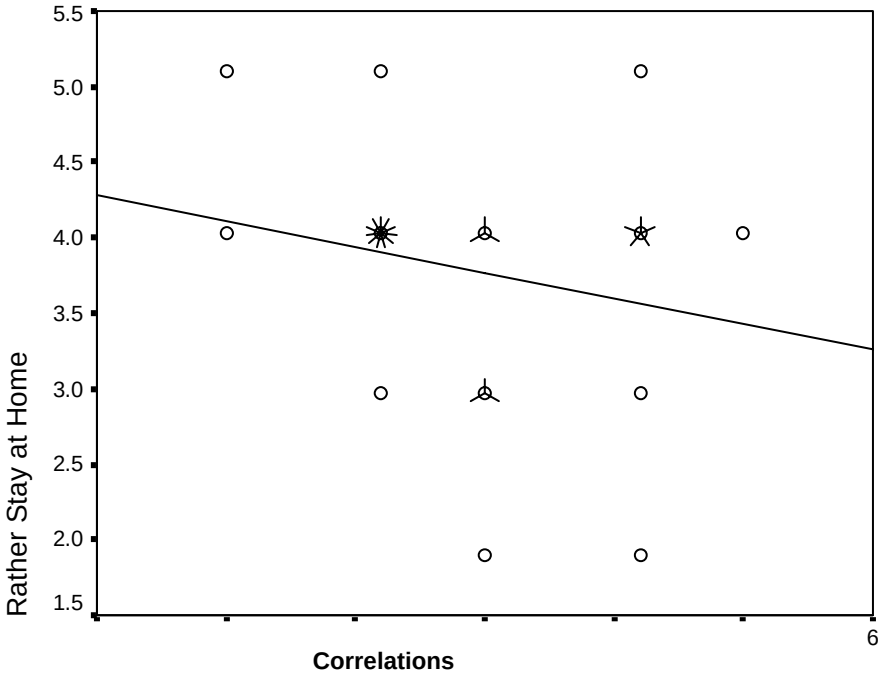
NOTE: The mean of the Like Children variable is incorrectly given on sample test as 4.3. It should be 4.1

29.

a. Count the events that lead to a 7: 1+6, 2+5, 3+4, 4+3, 5+2, and 6+1. There are six ways of rolling the 7. There are 36 total events (1+1, 1+2, 1+3, 1+4, 1+5, 1+6, etc.). The probability of rolling two dice and having the sum be 7 is 7 / 36.

b. First calculate the probability that they are four of a kind. Then use p(not four a kind) = 1 – p(four of a kind). For p(four of a kind), it doesn't matter which card is selected first. The second card selected must be the same as the first. Since there is no replacement, on the second draw, there are three cards of the same kind as the first and 51 total cards, p(1st card and 2nd card are the same) = 3 / 51. The third must be the same as the first two. There are 2 remaining cards that are the same and 50 cards total, p = 2 / 50. On the final draw, there is only 1 card that is the same as the first 3 and 49 total cards: 1 / 49. So p(all four are the same) = 3 / 51 * 2 / 50 * 1 / 49 = 6 / 124950. So the probability that the four cards are not the same = 1 – 6 / 124950 = 124944 / 124950 = .9999519

c. Convert to a z-score: $z = \frac{X - \mu}{\sigma} = \frac{27.5 - 35}{5} = -1.5$. Find the area above a z-score of –1.5 (or the area below a z-score of 1.5). From the table of areas under the unit normal curve, the area (and therefore the probability) is .933.



Correlations

		Rather Stay at Home	I Am an Extravert
Rather Stay at Home	Pearson Correlation	1.000	-.248
	Sig. (2-tailed)	.	.179
	N	31	31
I Am an Extravert	Pearson Correlation	-.248	1.000
	Sig. (2-tailed)	.179	.
	N	31	31

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.279	.365		11.729	.000
	I Am an Extravert	-.170	.124	-.248	-1.379	.179

a. Dependent Variable: Rather Stay at Home

30. First, create a scatterplot to check the assumptions of linearity (okay) and non-truncated range (okay). Second, calculate the correlation coefficient to see if the variables really are related (probably not in this case). Third, calculate the regression equation: friends' = -0.170 X extravert + 4.279