With X > 75 and with a mean of 79.9 and a SD of 4.2, the distribution has to have a long right tail, and almost no left tail.

The sample proportion is a statistic, not a parameter. One cannot make statements (c)-(e) from a sample.

The CI for μ is just that -- a CI for μ. It is not a statement about individuals. (c) is the most technically correct; some would let you get away with (d). (e) cannot possibly be correct, and in any case is not in the spirit of CI's, which try to bracket μ, not xbar.

Prob(|Z| > 1.4) is indeed about 0.16. It is 2-tailed.

If P = 0.04, the p <0.05 but P > 0.01. (c) and (d) are Bayesian type statements about hypotheses that are not to be confused with statements about data, conditional on H_0.

(b). No free lunch. If you want to be more sure, you have to less precise.

Yes. P < 0.05 if P=0.045.

The t-table with 29 df gives t*=1.699 for alpha=0.10 (2-sided). You would use 1.645 for infinite df.

False. If use a smaller, margin of error, cannot be as sure.

False. Statement is about Hypothesis. P-values are about data, conditional on (null) hypothesis.

True. If subjects underestimate systematically, no way for the SE or CI to capture this. If errors are random, they may add to the variability of the observed data, and so be reflected in the SE's calculated from them.

SD of Y=10X is 10SD(X). SD of Y+1 is SD(Y). No need for calculator.

Are looking for the z such that Prob(Z>z) =0.25. This is z=0.67 so IQ = 100 + zSD = 110.

The SD of 0'1 and 1's is $\sqrt{\text{prop[1-prop]}}$, where prop is the proportion of 1's. Here prob = 0.8 so SD = $\sqrt{0.8[0.2]}$ = 0.4. If you got a SD bigger than 1/2 the range of the data, you should have been suspicious. Easiest is a 2-point distribution, with values at two poles only. When 1/2 the data are at each pole, the SD is just the difference from the middle to either pole. So if we take 50 values at 5 - 3 and 50 at 5+3, we get SD=2 (here is a situation where all the data are 1SD from the mean!

Need to convert 7.1 and 7.6 into z's of –1.33 and +0.33, then get the areas below (9%) and above (37%) these respective values, then subtract their sum from 100.

A cell is a cell is a cell, and cells don't change their sizes just because there are more of them. The SD is an intrinsic feature of the population. The range would be bigger in larger universes.

E(sum) = sum(E's), even if correlated.

SD(sum) = Sqrt[Sum(var)] if uncorrelated. Sd's add in quadrature.

T = X + Y + Z will be closer to Gaussian than X or Y or Z (CLT).

Prob(A– B–) = Prob(A–) x Prob (B–) = 0.1 x 0.2 = 0.02. So if treat "test" as positive if either is positive, then sensitivity of "test" is 0.98.

One should be less suspicious than before the tests (assuming that the specificity of the "test" is at least 0.02), so that LR– is < 1. Post test odds depend on pre-test odds. If VERY suspicious pre-test, still suspicious post.

This is a classic case where negative predictive value should not be confused with 1-sensitivity. Likewise, what one can say about a hypothesis after the data is not the same as what one can say about the data, given the hypothesis.

We are dealing with variation of xbar based on n=9 when obsns are drawn from μ=0.004 and SD(indiv obsns) = 0.004. SEM=0.0012/√9 = 0.0004 is relevant. Prob xbar > 0.005 is the same as Prob((xbar – 0.004) / 0.00003 > 0.005 – 0.004) / 0.00003 = Prob (Z > 2.5).

Want zSEM=1.96SEM = 0.01; SEM = σ / √n = 0.010 / √n; solve for n = $z^2\ \sigma^2 / 0.01^2$ = 4.

Long left tail => mean < median => < 50% are below mean. Converse if long right tail.

100% sample, so SE =0 and no sampling uncertainty (may be errors in tabulation).

If interested in this as a sample of professors in all of McGill or in Canada (unwise to use it this way), then need to know the n. If treat sample as SRS, then Binomial SE(proportion) applies (ie $\sqrt{\text{prop[1-prop] / n}}$) ; might add correction for sampling fraction if large. Are not dealing with 2 independent proportions here, just 1 (if the 2 add to 100, they are perfectly negatively correlated).

If 95% CI excludes test value, then difference from test value is sig at 0.05 level ie $P < 0.05$.

n per group = $2 (z_{\alpha/2} - Z_\beta)^2 \sigma^2 / \partial^2$, where $z_{\alpha/2} = 1.96$; $Z_\beta = -1.28$ (1-sided always); σ=2 days and ∂ =0.25 days .

Use compared to for liken to or resemble, compared with for contrasts.

H0: $\mu_I = \mu_R$, where μ_I and μ_R are the average LOS's if all women were given I or R respectively.

If toss a coin each time for I or R, then # receiving I is Binomial(n=2834, π=0.5).

Dealing with inferences on means; n's VERY large, more than enough for the CLT to operate (variation of individual LOS's not that bad in any case).

Variation of individual LOS's somewhat skewed, so %iles better.

2-sample t-test with 2832 df, so t=z. difference in xbars is 25 g. s's will be about 500 g. won't have to worry about poling with huge df.

If we split a group at random into 2 and gave both the same management, the probability that we would get differences in means of 25 g or more is > 0.05.

If we split a group at random into 2 and gave both the same management, the probability that we would get differences in % with IGR as big or bigger than we got is 0.006.

Paired t-test with 11-1 = 10 df. Need the SD of the 11 differences.

When I (without checking carefully) set up the question, I thought they were 95% CIs for means. In fact they are xbar ± 1SD.

As indications of individual variability, they are not very helpful in judging differences in means. Moreover, because the data are paired, the SE of the d=average difference is not the SE for the difference of two independent means. 2 CIs can be used to judge significance in the latter case, but here we have pairing, which tends to make the SE of the average difference much smaller than the SE of the difference of two means taken to be independent.

We have one sample of differences, so we should summarize these. Note that the median of the 11 paired differences is not arithmetically the same as the difference of the 2 medians. (Unfortunately, the mean of the 11 paired differences is arithmetically the same as the difference of the 2 means, and that led some people to use a 2-sample test where a one sample (paired) test was more appropriate.

If all we had was people tested twice under 2 placebo conditions say, then we would expect that in π =0.5 of the persons we would get a positive difference.

This is an example of the Binomial distribution with n=10 and π =0.5. The prob of 9 or more positives is BinProb(9 | n=10 and π=0.5) + BinProb(10 | n=10 and π=0.5) = 0.010 + 0.001 from the Binomial table in M&M or the course material. Because of symmetry, the prob of 9 or more negatives is also 0.011, so The prob of 9 or more positives or negatives is 0.022 (two-tailed).

We are talking about P=0.002 calculated under H_0. So, if it were really two placebos, we must have observed quite an extreme result. We have evidence against this 2-placebo (null) H. It seems to be too extreme if all that were causing it were chance alone. Before attributing the extreme result to the oestradiol, one would want to check the design of the study (was there blinding? was the order of placebo and oestradiol randomized? etc.....