Q1. What is the mean birth weight for babies of non-smoking mothers?
The mean is 3.51 Kg.

Q2. What is the mean birth weight for babies of smoking mothers?
The mean is 3.13 kg.

Q3. What is the mean head circumference for babies of non-smoking mothers?
The mean is 35.05 cm.

Q4. What is the mean gestational age at birth for babies of smoking mothers?
The mean is 38.95 weeks.

Q5. What is the maximum head circumference for babies of non-smoking mothers?
It is 39 cm

Q6. What is the minimum gestational age at birth for babies of smoking mothers?
It is 33 weeks

Q7. Based on the dataset you have, out of the two, which one would be a better bet:

- Pregnancy period in smoking mothers is shorter
- Pregnancy period in non-smoking mothers is shorter

The better bet would be that pregnancy period in smoking mothers is shorter.

Q8. Justify the above choice in a few words.
The mean gestational age of birth for babies of smoking mothers is smaller than the mean gestational age of non-smoking mothers.

Q9. What is the baby birth weight range for babies of smoking mothers?
It is 2.65 kg.

Q10. In your own words describe what the value of the above range for baby's birthweight tells us about smoking versus non-smoking mothers?
It tells us that the baby’s birthweight of smoking mothers varies more than the one’s of non-smoking mothers.

Q11. Are head circumference data for babies of smoking mothers normally distributed?
Yes, they are.

Q12. What is the significance value for the above on the Shapiro-Wilk test?
It is 0.372.

Q13. What is the standard score (Z-score) for head circumference of 35.05 (X=35.05) in non-smoking mothers?
It is 0 because $x = mean$ as you can also see from the formula below:

$$Z = \frac{x - \mu}{\sigma} = \frac{35.05 - 35.05}{2.08} = \frac{0}{2.08} = 0$$

Q14. How are birth weight data of non-smoking mothers skewed?
It is positively skewed and approximately symmetric.

Q15. Are birth weight data for babies of smoking mothers normally distributed?
Yes , they are.

Q16. What is the significance value for the above on the Shapiro-Wilk test?
It is 0.949.

Q17. Based on the dataset you have, how confident can you be in saying that a baby's birth weight will be +/- 1 standard deviation from the mean?
68.2%.

Q18. Based on the dataset you have, what is the probability that the birth weight for a baby of a smoking mother will be less than 4.2 kg?

$$Z = \frac{x - \mu}{\sigma} = \frac{4.2 - 3.14}{0.63} = \frac{1.06}{0.63} = 1.68$$
$$P(Z \leq 1.68) \cong 0.9535$$

Q19. Are data for length of baby of non-smoking mothers normally distributed?
Yes, they are.

Q20. What is the significance value for the above on the Shapiro-Wilk test?
It is 0.07

Q21. What is the standard score for the length of a baby of 48.5cm for non-smoking mothers?

$$Z = \frac{x - \mu}{\sigma} = \frac{48.5 - 51.8}{3.25} = \frac{-3.3}{3.25} = -1.02$$

Q22. Based on the dataset you have, what is the probability that the length of baby for non-smoking mothers will be more than 55 cm?

$$Z = \frac{x - \mu}{\sigma} = \frac{55 - 51.8}{3.25} = \frac{3.2}{3.25} = 0.98$$
$$P(Z > 0.98) = 1 - P(Z \leq 0.98) = 1 - 0.8365 = 0.1635$$