1. Question 1 could be addressed using either a two sample t-test or by conduction a simple linear regression Here is the R code and output for the t-test:

> t.test(birthweight~treatment,var.equal=TRUE)

        Two Sample t-test

data:  birthweight by treatment
t = 1.568, df = 484, p-value = 0.1175
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -31.22632 277.98916
sample estimates:
mean in group 0 mean in group 1
 2138.831        2015.450

Here is the code and output for testing this with simple linear regression:

> summary(lm(birthweight~treatment))

Call:
lm(formula = birthweight ~ treatment)

Residuals:
 Min 1Q Median 3Q Max
-1539.83 -698.83 -10.83 643.70 2487.17

Coefficients:
 Estimate Std. Error t value Pr(>|t|)
(Intercept) 2138.83      56.32  37.975 <2e-16 \*\*\*
Treatment   -123.38     78.69  -1.568 0.118
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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 867.1 on 484 degrees of freedom
Multiple R-squared: 0.005054, Adjusted R-squared: 0.002999
F-statistic: 2.459 on 1 and 484 DF, p-value: 0.1175

1. R code and output for question 2:

>summary(lm(birthweight~treatment+gestage+mat\_age+malesex))

Call:

lm(formula = birthweight ~ treatment + gestage + mat\_age + malesex)

Residuals:
 Min      1Q  Median      3Q     Max
 -1245.1  -225.2    -7.3   219.3   1838.3

Coefficients:

 Estimate Std. Error t value Pr(>|t|)
(Intercept) -4398.5449   168.0465 -26.175   <2e-16 \*\*\*

treatment      -58.8507   35.5726  -1.654   0.0987 .
gestage        194.4967     4.4552  43.657   <2e-16 \*\*\*
mat\_age         -0.2684     2.5104 -0.107   0.9149
malesex         60.1052    35.8103  1.678   0.0939 .
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Signif. codes:  0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 390.2 on 481 degrees of freedom
Multiple R-squared:  0.7997,    Adjusted R-squared:  0.7981
F-statistic: 480.2 on 4 and 481 DF,  p-value: < 2.2e-16

**Interpretation:**

1. In the crude analysis babies born to treated mothers weighted 123 grams less than babies born to untreated mothers, but the difference was not statistically significant (p=0.1175).
2. After adjusting for gestational age, maternal age, and male sex, the difference in birthweights was even smaller (59 grams less in the treated group), and the difference was still not statistically significant (p=0.10). Gestational age was the only significant predictor of birthweight (+194 grams for each additional week of gestation).