The table below provides partial information on the market for children’s toys. The data

represents quarterly sales (in millions) of toys over the period 1995 – 2004.

Quarterly Sales over 1995 – 2004 (in millions)

|  |  |  |
| --- | --- | --- |
| Year | Quarter | Sales |
| 1995 | 1 | 133 |
|  | 2 | 135 |
|  | 3 | 140 |
|  | 4 | 181 |
| 1996 | 1 | 141 |
|  | 2 | 170 |
|  | 3 | 172 |
|  | 4 | 186 |
| 1997 | 1 | 143 |
|  | 2 | 148 |
|  | 3 | 150 |
|  | 4 | 194 |
| 1998 | 1 | 154 |
|  | 2 | 156 |
|  | 3 | 158 |
|  | 4 | 196 |
| 1999 | 1 | 153 |
|  | 2 | 161 |
|  | 3 | 193 |
|  | 4 | 204 |
| 2000 | 1 | 158 |
|  | 2 | 169 |
|  | 3 | 171 |
|  | 4 | 209 |
| 2001 | 1 | 172 |
|  | 2 | 207 |
|  | 3 | 209 |
|  | 4 | 214 |
| 2002 | 1 | 183 |
|  | 2 | 212 |
|  | 3 | 184 |
|  | 4 | 219 |
| 2003 | 1 | 181 |
|  | 2 | 190 |
|  | 3 | 222 |
|  | 4 | 227 |
| 2004 | 1 | 199 |
|  | 2 | 228 |
|  | 3 | 230 |
|  | 4 | 229 |

a. Firms in the industry are concerned about sales. They would like to know if there is an

upward trend in sales of children’s toys. Use the data above to estimate the quarterly trend in

sales using a linear trend model of the form: *Qt* = *a* + *bt*. Does your statistical analysis

indicate a trend? If so, is it an upward or downward trend and how great is it? (use the 5

percent level of significance to test for statistical significance)?

b. A follow manager points out that there might be a seasonal variation in the data and

suggested that you tested for statistically significant seasonal pattern. How would you adjust

your statistical model to account for seasonal variation in children’s toys sales. Describe your

model completely. Then estimate the adjusted model using the data provided. Does the data

indicate a statistically significant seasonal pattern in sales (use the 5 percent level of

significance)? If so, explain the nature of the variation.

c. Comparing your estimates of the trend in sales in parts *a* and *b*, which estimate is

likely to be more accurate? Why?

d. Using the estimated forecast equation from part *b*, forecast the industry’s sales for the next

quarter (winter 2005).