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).