

INVESTIGATION 31

Application: Statistics

Skill: Finding statistics and drawing box plots

A Weekend at the Movies!



Each weekend many people go to the movies. Below is a table of the top ten movies attended one weekend. For each of the movies an estimate is given in weekend ticket sales and the number of theaters in which the movie was shown.

<u>Rank of Movie</u>	<u>Ticket Sales</u>	<u>Number of Theaters</u>
1	\$5,700,000	2,745
2	\$5,500,000	2,352
3	\$5,100,000	2,427
4	\$4,700,000	1,469
5	\$2,600,000	2,007
6	\$2,500,000	2,461
7	\$2,450,000	2,250
8	\$2,300,000	131
9	\$2,000,000	581
10	\$2,000,000	1,997

Solve this problem...

Raw data is analyzed using statistics. Find the statistics of the weekend ticket sales by first entering the data into the graphing calculator. On most graphing calculators this is within a list in the statistics data editor. Clear all old statistical data before the new data is entered. After entering the data, exit the data editor and compute the one-variable statistics for the data set. Press the down arrow key to see additional statistics.

```

1 Stats
↑Σx²=1.431425E14
n=10
xmin=2000000
Q1=2300000
Med=2550000
Q3=5100000
xmax=5700000
    
```

INVESTIGATION 31 *continued*

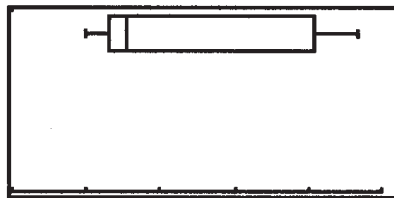
Five numbers are of interest. These five numbers are the minimum, first quartile, second quartile, third quartile, and maximum. The second quartile (Q2) is often called the median. The median is the middle-most value or the 50th percentile of the data set. The 50th percentile means that 50% of the data is less than this value and 50% of the data is greater than this value. The first quartile (Q1) and third (Q3) quartile are the 25th and 75th percentiles respectively. The minimum (Min) and maximum (Max) are the smallest and largest values in the data set.

The graphing calculator's output shows that the 25th percentile (Q1) in sales is \$2,300,000. The median or 50th percentile is \$2,550,000 in ticket sales. The 75th percentile in sales is \$5,100,000.

The minimum sales for a top ten movie is \$2,000,000, whereas the maximum sales is \$5,700,000.

A boxplot will represent the distribution of ticket sales. Draw the boxplot by entering the statistical graphing menu on the calculator. Turn the first statplot on and set it for one-variable data. Choose the boxplot and set an appropriate viewing window to see the boxplot.

An appropriate viewing window would have ymin set to 0 and a ymax set to 1. Set xmin to a number a little less than the minimum of the data set (1,000,000), and set xmax to a number a little more than the maximum of the data set (6,000,000). Set the xscl for appropriate spacing (1,000,000). Press the graphing key to view the box plot.



The box represents the middle 50% of the sales. The left side of the box is the 25th percentile and the right side is the 75th percentile. The left horizontal line off the box represents the lower 25% and the right horizontal line represents the upper 25%. The left endpoint is the minimum and the right endpoint is the maximum. The vertical line inside the box represents the median.

NAME _____ DATE _____

INVESTIGATION 31 continued

Practice this problem...

1. Find the statistics for the number of theaters.

Minimum = _____

Q1 = _____

Median = Q2 = _____

Q3 = _____

Maximum = _____

2. Find the boxplot for the number of theaters. Draw what you find in the box provided below.



INVESTIGATION 31 continued

Solve this problem...

3. The total sales for each of the top ten movies since their release is shown in the table below. Find the statistics and boxplot for the data.

<u>Movie</u>	<u>Total Sales</u>
1	\$17,300,000
2	\$5,500,000
3	\$50,900,000
4	\$13,600,000
5	\$145,700,000
6	\$82,200,000
7	\$55,000,000
8	\$2,400,000
9	\$2,000,000
10	\$151,700,000

Minimum = _____

Q1 = _____

Median = Q2 = _____

Q3 = _____

Maximum = _____

4. Find the boxplot for the number of theaters. Draw what you find in the box provided below.

