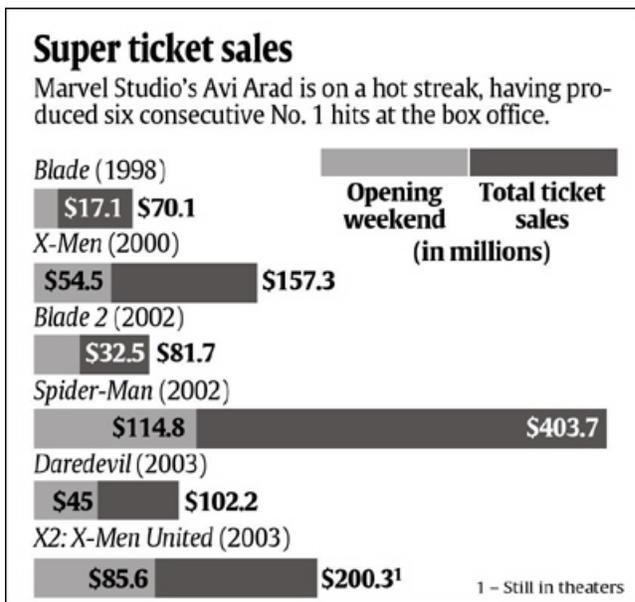




Activity 2:

Super ticket sales

by: Bob Tower - Revised from *Math TODAY: Super ticket sales* by Brenda Perkins for USA TODAY.



Source: Nielsen EDI

By Julie Snider, USA TODAY

Activity Overview:

Students will create two box-and-whisker plots of the data in the USA TODAY Snapshot, "Super ticket sales." Students will calculate central tendencies for both sets of data. Students will compare the two sets of data by analyzing the differences in the box-and-whisker plots.

Concepts:

- Measuring central tendencies (mean, median, and mode)
- Creating and interpreting box-and-whisker plots
- Gathering data entries from a graphical source
- Evaluating, synthesizing, and analyzing real-world data

Activity at a Glance:

- Grade level: 6-8
- Subject: Pre-Algebra
- Estimated time: 50 minutes

Materials:

- TI-Navigator™ system
- TI-83 Plus or TI-84 Plus family of graphing calculators

Recommended:

- USA TODAY Newspapers
- Multimedia Projector
- TI Keyboards

Prerequisites:

Students should know how to:

- calculate mean, median, and mode
- enter a list into the list editor
- construct a box-and-whisker plot

TI | **navigator**

For use with the TI-Navigator™
Classroom Learning System



Student Objectives:

- Gather data from a graphical source
- Calculate mean, median, and mode for each set of data
- Create a box-and-whisker plot for each set of data

Background:

In this activity, students will compare ticket sales from movies based on Marvel Comic characters and produced by Marvel Studios as shown in the USA TODAY Snapshot, "Super ticket sales." This activity starts with the gleaming of data from a graphical source. The students must read the USA TODAY Snapshot carefully as the data placement is not obvious. Students will explore the relationship of the ticket sales from the opening weekend and the total ticket sales by calculating their central tendencies as well as using their box-and-whisker plots. Students will be able to explore a box-and-whisker plot with an outlier and without an outlier.

Since this is real-world data, the students get to work with imperfect mathematical models. The box-and-whisker plots are not textbook perfect. Having the two pieces of data in the same graphic allows students to practice analyzing and comparing.

The corresponding USA TODAY article, "Conquering comic heroes," helps make the data more concrete and allows for reading in the mathematics classroom.

Preparation:

- Download the activity files to your computer: Teacher Edition, Student Edition, Transparency, Activity Center Settings, Lists and LearningCheck™ Assessment. (See Appendix B for a list of the files.)
- Make copies of the Student Edition for your class. Students can refer to the Student Edition during the activity and use it to record their work.
- Set up your TI-Navigator system and make sure you are familiar with the following functions: Send to Class, Collect from Class, Screen Capture, Quick Poll, Activity Center, LearningCheck Assessment, and Class Analysis.
- Students will need a TI-83 Plus or TI-84 Plus graphing calculator, either working in pairs or individually.
- Recommendations:
 - Multimedia Projector for sharing the Activity Center, Quick Polls, and Screen Captures with your students
 - TI Keyboards to easily answer LearningCheck assessment questions

Data Source:

Nielsen EDI

Activity Extensions:

- Ask the students to develop a marketing strategy for the opening of Marvel Studios' next movie. Ask them to create ads for USA TODAY and posters to promote the premiere. This would be an appropriate place to practice some of the geometry standards such as symmetry, proportionality, and drawing specific geometric figures.
- Before beginning this activity, ask the students to locate a movie review in today's USA TODAY or any other newspaper. Then, have students answer the following questions: What does the reviewer like about the movie? Dislike? How do you know? Based on the review, what do you think the movie is about? What doesn't the reviewer tell you about the movie? Why do you think that is?
- Movie reviews contain information about the movie (plot, characters, setting, etc.) and the writer's opinion of how well the actors and director have presented an effective storyline. A good review presents evidence to support this opinion, and in the process helps the reader gain an insight into the story. A review should not reveal too much about a movie so as to spoil any major events, such as the ending. Watch a movie on video, on TV, or attend a showing at your local theater. Then write a movie review using the above guidelines.

Curriculum Connection:

- Business/Marketing/Economics

**Teacher:****Classroom Management Tips:**

- You may use the transparency for a class discussion before the students start working. This will give the students a better understanding of how to read the graphic and retrieve data.
- Remind students to carefully read all parts of the graphic before they start collecting data.
- Students can work individually or in small groups to assist each other. Working in groups is especially helpful as they learn the various features of the calculator.
- Allow students to talk about the "how" and "why" approach they used to find the solution.
- This activity can be used as a review of concepts or a culminating activity with the class.

Students:**Activity Step-by-Step:**

The following steps represent a suggested TI-Navigator classroom procedure to answer the focus questions.

1. Send to Class – send ticket sales data files to class
2. Calculator – determine the mean, median, and mode for the opening weekend
3. Calculator – create a box-and-whisker plot for the opening weekend
4. Screen Capture – check student understanding
5. Quick Poll – True/False, the box-and-whisker plot for the opening weekend does show an outlier
6. Quick Poll – Multiple Choice, where does the largest spread in the data occur?
7. Calculator – determine the mean, median, and mode for total ticket sales
8. Calculator – create a box-and-whisker plot for total ticket sales
9. Screen Capture – check student understanding
10. Quick Poll – Open Response, what value represents the third quartile?
11. Quick Poll – True/False, the box-and-whisker plot for the total ticket sales does show an outlier
12. Activity Center – explore the mean and median for the opening weekend
13. Activity Center – explore the mean and median for the total ticket sale

Focus Questions:

- What are the mean, median, and mode values for the opening weekend?
- Using the box-and-whisker plot that represents the ticket sales for the opening weekends, where is the first quartile?
- Using the box-and-whisker plot that represents the ticket sales for the opening weekends, are there any outliers? Where does the largest spread occur?
- What are the mean, median, and mode values for total ticket sales?
- Using the box-and-whisker plot that represents the total ticket sales, where is the third quartile?
- Using the box-and-whisker plot that represents the total ticket sales, are there any outliers?

Reading Comprehension:

- What types of directors are being put in charge of making the movies based on Marvel and DC Comics?

Teacher:

- Optional for Steps 11-13: LearningCheck Assessment – answer the focus questions and discuss the results with your class to check for understanding
- Optional: LearningCheck Reading Comprehension – answer the reading comprehension questions and discuss the results with your class to check for understanding

See below for details on each of these steps.

**STEP 1 – SEND TO CLASS**

- After students have logged into TI-Navigator, send the “Super ticket sales” data (MT02L1.8xl and MT02L2.8xl) to the class using **Force send to students now**.

*The data represents the opening and total ticket sales for Marvel Studio's *Avi Arad* who has produced six consecutive No. 1 hits at the box office. Students will use this data to find the measures of central tendency.*

- Once the data is downloaded, instruct your students to exit the TI-Navigator system.

**STEP 2 – CALCULATOR**

- Instruct your students to use their calculators to determine the mean, median, and mode for the opening weekend.

Students:

- What numbers appeared in the article as well as in the USA TODAY Snapshot, "Super ticket sales?"
- What was the original superhero blockbuster and in what year was it released?
- Bryan Singer brought about a Marvel-led genre revival by remembering that the movies based on comics needed to be about what?

- Press **[APPS]**, select **NavNet**, and login.
- Wait for the teacher transfer – the data is downloaded in two lists, L1 and L2.
- Once the data is downloaded, press **BACK** (**[ZOOM]**) and then **[4]** to **EXIT APP**.

- Press **[2nd]** **[LIST]** **[↓]** and select the commands to calculate the mean and median values for L1.
- Press **[STAT]** **[ENTER]** to look at the data to determine the mode.
- Record answers on the Student Edition for the opening weekend.

Teacher:

Students:

**STEP 3 – CALCULATOR**

1. Instruct your students to use their calculators to create a box-and-whisker plot for the opening weekend.

Remind students to only have one plot active (on) and to clear all entries in the Y= editor.

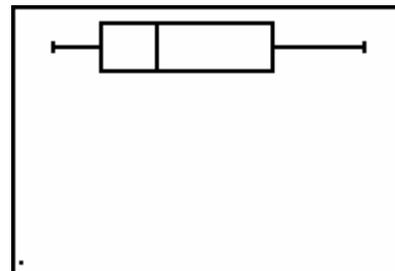
1. Press $\boxed{2\text{nd}}$ [STAT PLOT] and make the appropriate setting for P1ot1 to show a box-and-whisker plot with outliers.
2. Set the appropriate window and press $\boxed{\text{GRAPH}}$.
3. Wait for teacher instructions.

**STEP 4 – SCREEN CAPTURE**

1. Use **Screen Capture** to check student understanding.

The box-and-whisker plots should look like the image on the right. If not, this is an opportunity to discuss how to create and format a box-and-whisker plot.

2. Remind students to record the values for xMin, Q1, Median, Q3, and xMax on their answer sheets for later use.
3. Instruct your students to return to TI-Navigator when you are ready to go to the next step.



2. Press **Trace** and use the arrow keys to identify xMin, Q1, Median, Q3, and xMax. Record these values on your student sheet.
3. Press $\boxed{\text{PRGM}}$, select GONAVNET and press $\boxed{\text{ENTER}}$.

**STEP 5 – QUICK POLL**

1. From the pull-down menu select **True False**.
2. Press $\boxed{\text{Start Poll}}$ when you are ready to start.
3. Instruct the class to answer this question:

Q. The box-and-whisker plot for the opening weekend does show an outlier.

A. False

4. Discuss with your class to check for understanding.

NOTE: Select $\boxed{\text{Pause Poll}}$ to have a class discussion, then select $\boxed{\text{Resume Poll}}$ to continue.

Press $\boxed{\text{Stop Poll}}$ when you are ready to go on to the next step.

1. Input answer and press **SEND** ($\boxed{\text{Y=}}$).

Teacher:

Students:

**STEP 6 – QUICK POLL**

- From the pull-down menu select **Multiple Choice A thru D**.
- Press when you are ready to start.
- Instruct the class to answer this question:

Q. Where does the largest spread in the data occur?

A) between smallest data point and Q1
B) between Q1 and the median
C) between the median and Q3
D) between Q3 and the largest data point

A. C) between the median and Q3
- Discuss with your class to check for understanding.
NOTE: Select to have a class discussion, then select to continue.
- Press when you are ready to go on to the next step.
- Instruct your students to exit the TI-Navigator system when you are ready to go to the next step.

- Input answer and press SEND ().
- Press to EXIT APP.

**STEP 7 – CALCULATOR**

- Instruct your students to use their calculators to determine the mean, median, and mode for total ticket sales.

- Press [LIST] and select the commands to calculate the mean and median values for L2.
- Press to look at the data to determine the mode.

**STEP 8 – CALCULATOR**

- Instruct your students to use their calculators to create a box-and-whisker plot for total ticket sales.

- Press [STAT PLOT] and make the appropriate setting for Plot1 to show a box-and-whisker plot with outliers.
- Set the appropriate window and press .
- Wait for teacher instructions.

Teacher:

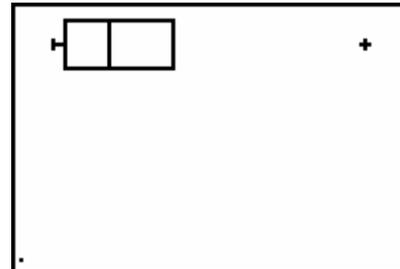
Students:

**STEP 9 – SCREEN CAPTURE**

1. Use **Screen Capture** to check student understanding.

The box-and-whisker plots should look like the image on the right. If not, this is an opportunity to discuss how to create a box-and-whisker plot.

2. Instruct your students to return to the TI-Navigator system when you are ready to go to the next step.



1. Press **PRGM**, select GONAVNET and press **ENTER**.

**STEP 10 – QUICK POLL**

1. From the pull-down menu select **Open Response** and check **Resubmit** so that students may change their answers.
2. Press **Start Poll** when you are ready to start.
3. Instruct the class to answer this question:

Q. What value represents the third quartile?

A. 200.3

4. Discuss with your class to check for understanding.
NOTE: Select **Pause Poll** to have a class discussion, then select **Resume Poll** to continue.
5. Press **Stop Poll** when you are ready to go to the next step.

1. Input answer and press SEND (**Y=**).
2. Resubmit answer as needed during the class discussion.

**STEP 11 – QUICK POLL**

1. From the pull-down menu select **True False**.
2. Press **Start Poll** when you are ready to start.
3. Instruct the class to answer this question:

Q. The box-and-whisker plot for the total ticket sales does show an outlier.

A. True

4. Discuss with your class to check for understanding.
NOTE: Select **Pause Poll** to have a class discussion, then select **Resume Poll** to continue.

1. Input answer and press SEND (**Y=**).

Teacher:

5. Press  **Stop Poll** when you are ready to go to the next step.

**STEP 12 – ACTIVITY CENTER**

1. In Activity Center, use **Load Activity Settings** to load MT_SuperOpening.act.
2. Select the **List** tab.
3. Press  **Start Activity** to begin.
4. Instruct your students to enter the mean and median for the opening weekend into two lists.
5. As submissions appear, discuss the following with your class to check for understanding:
 - Submissions that are particularly interesting or ambitious
 - Submissions that have common errors

NOTE: Select  **Pause Activity** to have a class discussion. Select  **Resume Activity** to continue.

Sample discussion questions:

- All the points should be the same, if not, ask students to explain possible reasons why the values are not the same.
 - What is the meaning of median/mean in this problem situation?
6. Press  **Stop Activity** when you are ready to go to the next step.

Students:

1. From the TI-Navigator home screen press  Activity Center.
2. When prompted, enter your mean and median values for the opening weekend.

**STEP 13 – ACTIVITY CENTER**

1. In Activity Center, use **Load Activity Settings** to load MT_SuperTotal.act.
2. Select the **List** tab.
3. Press  **Start Activity** to begin.
4. Instruct your students to enter the mean and median for the total ticket sales into two lists.
5. As submissions appear, discuss the following with your class to check for understanding:
 - Submissions that are particularly interesting or ambitious
 - Submissions that have common errors

NOTE: Select  **Pause Activity** to have a class discussion. Select  **Resume Activity** to continue.

1. From the TI-Navigator home screen press  Activity Center.
2. When prompted, enter your mean and median values for the total ticket sales.

Teacher:Sample discussion questions:

- All the points should be the same, if not ask students to explain possible reasons why the values are not the same.
 - What is the meaning of median/mean in this problem situation?
6. Press **Stop Activity** when you are ready to go to the next step.

Students:**STEP 14 –****LEARNINGCHECK ASSESSMENT**

1. Using **Send to Class**, distribute the LearningCheck assessment file, Super1.edc to your students using **Force send to students now**.
2. Prompt the students to open the LearningCheck assignment and answer the following questions:

Q. What are the mean, median, and mode values for the opening weekend?

A. Mean = \$58.3 million, median = \$49.8 million, mode = none

Q. The box-and-whisker plot represents the ticket sales for the opening weekends. Which letter represents the first quartile?

A. B (see Screenshot #1)

Q. The box-and-whisker plot represents the ticket sales for the opening weekends. Are there any outliers? Where does the largest spread occur?

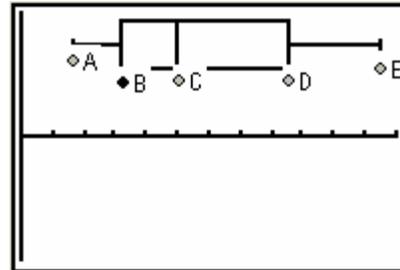
A. There are no outliers. The largest spread occurs above the median. (see Screenshot #2)

Q. What are the mean, median, and mode values for total ticket sales?

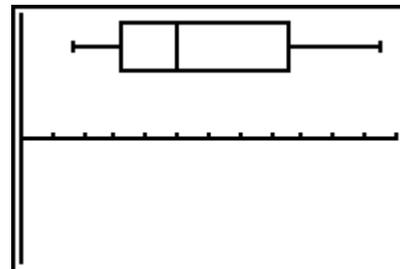
A. Mean = \$169.2 million, median = \$129.8 million, mode = none

1. From the TI-Navigator home screen press Network Apps.
2. Select LearnChk.
3. Select the Super 1 assignment and follow the prompts to answer the questions.

NOTE: TI Keyboards may be used to answer the questions.



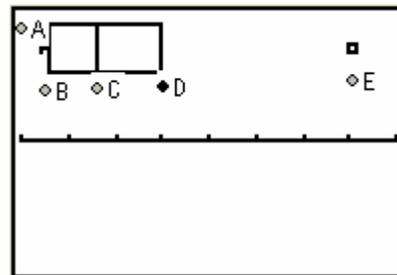
Screenshot #1



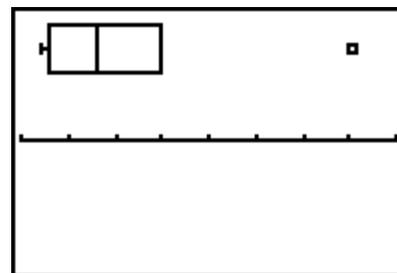
Screenshot #2

Teacher:

- Q. The box-and-whisker plot represents the total ticket sales. Which letter represents the third quartile?**
- A. D (see Screenshot #3)
- Q. The box-and-whisker plot represents the total ticket sales. Are there any outliers?**
- A. Yes (see Screenshot #4)
- Select **Class Analysis** and make sure all of the students have completed the assignment.
 - Select **Collect Answers Files From Class**.
NOTE: Before collecting the answers, we recommend that you check these options:
 - **Delete Answer File from Device after Collect**
 - **Delete Assignment File from Device after Collect**
 - Using **Class Results Slide Show**, discuss the results with your class to check for understanding.

Students:

Screenshot #3



Screenshot #4



STEP 15 – LEARNINGCHECK

READING COMPREHENSION

- Using **Send to Class**, distribute the LearningCheck assessment file, Super2.edc to your students using **Force send to students now**.
- Prompt the students to open the LearningCheck assignment and answer the following questions:

Q. What types of directors are being put in charge of making the movies based on Marvel and DC Comics?

A. The studios are looking for distinctive filmmakers and directors who respect the material's modern-day myths yet carry enough confidence to lend a personal sensibility.

Q. What numbers appeared in the article as well as in the USA TODAY Snapshot, "Super ticket sales?"

A. The article refers to the \$157 million total box office income for X-Men and \$32.5 million opening weekend for Blade II.

- From the TI-Navigator home screen press Network Apps.
- Select LearnChk.
- Select the Super2 assignment and follow the prompts to answer the questions.

NOTE: It is recommended that students use TI Keyboards to answer reading comprehension questions. If you don't have TI Keyboards, these questions are in the Student Edition and can be answered in writing.

Teacher:

- Q. What was the original superhero blockbuster and in what year was it released?**
- A. The original superhero blockbuster was *Superman*, released in 1978.
- Q. Bryan Singer brought about a Marvel-led genre revival by remembering that the movies based on comics needed to be about what?**
- A. Singer remembered to focus on the human, not the hero.
3. Select  **Class Analysis** and make sure all of the students have completed the assignment.
4. Select  **Collect From Class**.
NOTE: Before collecting the answers, we recommend that you check these options:
- **Delete Answer File from Device after Collect**
 - **Delete Assignment File from Device after Collect**
5. Using  **Class Results Slide Show**, discuss the results with your class to check for understanding.

Students: