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Reading Numbers

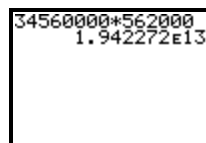
2

Mode Check. Press **MODE**. Make sure settings are as shown. If you need to change a setting, highlight the change using the arrow keys and press **ENTER**. Press **2nd** **QUIT** or **CLEAR** to return to the home screen. To erase any previous work, press **CLEAR**.



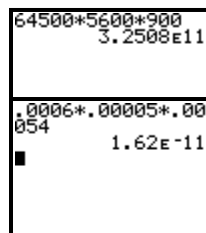
The TI-83 calculator can display numbers between -9,999,999,999 and 9,999,999,999 in standard decimal notation. Numbers above 9,999,999,999 and below -9,999,999,999 as well as numbers very close to zero will be expressed in scientific notation. The range of numbers that the calculator can handle is $-9.999999999 \times 10^{99}$ to $9.999999999 \times 10^{99}$.

The screen to the right shows the product of 34,560,000 and 562,000. The answer 1.942272E13 translates to 1.942272×10^{13} . In decimal notation this is 19,422,720,000,000 or nineteen trillion, four hundred twenty-two billion, seven hundred twenty million.



Write each answer in scientific notation and decimal notation.

3.2508E11 translates to 3.2508×10^{11} . In decimal notation, this is 325,080,000,000.



1.62E11 translates to 1.62×10^{-11} . In decimal notation, this is 0.0000000000162.

Reading Numbers

2

Let's Practice

Mode Check. Press **MODE**. Make sure settings are as shown. If you need to change a setting, highlight the change using the arrow keys and press **ENTER**. Press **2nd** **QUIT** or **CLEAR** to return to the home screen. To erase any previous work, press **CLEAR**.



Write the answer from each screen display in scientific notation and decimal notation.

1. $16500 \times 4600 \div 15000$
1.1385E12

2. $2450.1 \div .00000000$
00087
2.816206897E14

3. $87000 \times 60000 \div 3500$
1.827E13

4. $-3500 \times 400000 \div 300$
-4.2E11

5. $.00075 \times .000091 \div .005$
3.4125E-10

6. $.00035 \times .006 \div .02$
4.2E-8

7. 3000^4
8.1E13

8. $(-3200)^3$
-3.2768E10

9. 90000×4000000
3.6E11

10. $.00006 \times .0005$
3E-8

11. $350000000000 \div 100$
3.5E13

12. $.00006 \times .0000095$
5.7E-10

13. $.00006^3$
2.16E-10

14. $80000 \times 90000 \div 6500$
4.68E13

15. $.00007 \times .0014^2$
1.372E-10

Fraction Operations

7

Mode Check. Press **MODE**. Make sure settings are as shown. If you need to change a setting, highlight the change using the arrow keys and press **ENTER**. Press **2nd** **QUIT** or **CLEAR** to return to the home screen. To erase any previous work, press **CLEAR**.

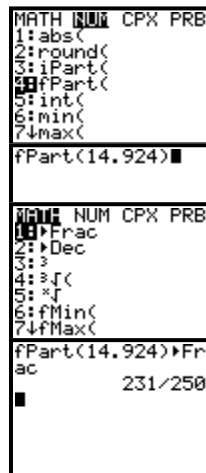


Convert the decimal 14.924 to a mixed number.

The whole number part of the mixed number is 14. The fraction part of the mixed number can be found by using special math operations.

Press **MATH**, highlight NUM by pressing the **▸**, press **4** for 4:fPart(), then press **1 4 . 9 2 4) MATH 1 ENTER**.

So the decimal 14.924 is equivalent to $14 \frac{231}{250}$.



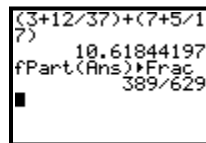
Add the mixed numbers $3 \frac{12}{37}$ and $7 \frac{5}{17}$.

(3 + 1 2 ÷ 3 7) + (7 + 5 ÷ 1 7) ENTER

So the sum of $3 \frac{12}{37}$ and $7 \frac{5}{17}$ is 10.61844197...

Press **MATH**, highlight NUM by pressing the **▸**, press **4 2nd** **ANS** **)**, then press **MATH 1 ENTER**.

So the sum of $3 \frac{12}{37}$ and $7 \frac{5}{17}$ is $10 \frac{389}{629}$.



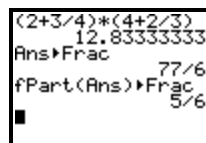
Multiply the mixed numbers $2 \frac{3}{4}$ and $4 \frac{2}{3}$.

(2 + 3 ÷ 4) × (4 + 2 ÷ 3) ENTER

The answer is 12.83. Convert this answer to an improper fraction or a mixed number.

To convert the answer to an improper fraction, press **MATH 1 ENTER** and the answer is $\frac{77}{6}$.

To convert the answer to a mixed number, press **MATH**, select NUM by pressing the **▸**, press **4 2nd** **ANS** **)**, then press **MATH 1 ENTER**, which gives you $\frac{5}{6}$, therefore the mixed number answer is $12 \frac{5}{6}$.



Fraction Operations**7****Let's Practice**

Mode Check. Press **MODE**. Make sure settings are as shown. If you need to change a setting, highlight the change using the arrow keys and press **ENTER**. Press **2nd** **QUIT** or **CLEAR** to return to the home screen. To erase any previous work, press **CLEAR**.

```
Normal Sci Eng
Float 0123456789
Radian Degree
Func Par Pol Seq
Connected Dot
Sequential Simul
Real a+bi re^θi
Full Horiz G-T
```

Convert each decimal to a mixed number.

1. 15.875

2. 23.84

Perform these calculations. Give answers as decimals and mixed numbers.

Round decimal answers to the nearest hundredth.

3. $\frac{5}{8} + \frac{4}{9} =$

4. $\frac{7}{8} - \frac{7}{15} =$

5. $2\frac{1}{9} \times 3\frac{4}{11} =$

6. $6\frac{1}{7} \div 4\frac{3}{13} =$

7. $6\frac{1}{6} + 2\frac{5}{11} =$

8. $4\frac{3}{13} \times 2\frac{1}{9} =$

9. $2\frac{5}{11} \div 6\frac{1}{6} =$

10. $3\frac{4}{11} - 2\frac{1}{9} =$

11. $2\frac{1}{9} (6\frac{4}{5} + 2\frac{5}{11}) =$

12. $\frac{2\frac{1}{9} - \frac{7}{15}}{4\frac{3}{13} \div 6\frac{1}{6}} =$

Box Plots

14

Mode Check. Press **MODE**. Make sure settings are as shown. If you need to change a setting, highlight the change using the arrow keys and press **ENTER**. Press **2nd** **QUIT** or **CLEAR** to return to the home screen. To erase any previous work, press **CLEAR**.

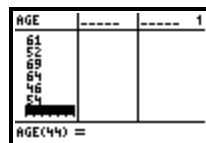


The TI-83 calculator can construct two different box plots. One shows the outliers and the other does not. Three box plots can be displayed at one time, allowing comparisons between three related data sets.

The ages of U.S. Presidents from Washington to Bush at inauguration are 57, 61, 57, 57, 58, 57, 61, 54, 68, 51, 49, 64, 50, 48, 65, 52, 56, 46, 54, 49, 50, 47, 55, 55, 54, 42, 51, 56, 55, 51, 54, 51, 60, 62, 43, 55, 56, 61, 52, 69, 64, 46, and 54.

Enter the ages into the list named AGE.

Press **STAT**, then press **1** for 1:Edit. Remove all lists by placing the cursor on the left most name in the title bar (using the arrow keys) and pressing **DEL**. Type the word AGE. Press **ENTER** and then **▼**. Enter the ages.



Construct a box-and-whisker plot using the AGE data.

To return to the home screen, press **2nd** **QUIT**. To remove any previous calculations, press **CLEAR**. Press **2nd** **STAT PLOT**. Open Plot1 by pressing **1**. Press **ENTER** to turn on the plot. Press **▼**, and then use **▶** to select the first box plot (□-|---). The first box plot includes outliers; the second does not. Press **ENTER** and then press **▼**. Press **2nd** **LIST** and then select AGE and press **ENTER** **▼**. The frequency is 1; press **ALPHA** **1** **ENTER**. Choose whatever mark you like. Press **ZOOM**, then press **9**, for 9:ZoomStat. The five number summary (42, 51, 55, 58, 69) can be found by pressing the **TRACE** key and using the **▶** and **◀** arrows. Notice the age 69 is an outlier.



Enter these batting average data into lists named TEAM1 and TEAM2.

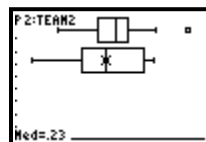
(**ALPHA** **T** **ALPHA** **E** **ALPHA** **A** **ALPHA** **M** **1**)

Team 1 = { .244, .262, .218, .224, .248, .163, .198, .225, .259, .233, .299, .206, .343, .259, .255 }
Team 2 = { .198, .202, .275, .264, .297, .287, .128, .154, .187, .287, .229, .286, .281, .224, .231 }

Construct box plots using the Team 1 and Team 2 batting average data.

Press **2nd** **STAT PLOT**. Open Plot1 by pressing **1**. Press **ENTER** to turn on the plot. Press **▼**, and then use the **▶** to select the first box plot (□-|---). Press **ENTER** and then **▼**. Press **2nd** **LIST**, select TEAM1, and press **ENTER**. The frequency is 1 and the mark is up to you. Repeat these steps to turn on Plot 2 using TEAM2 data.

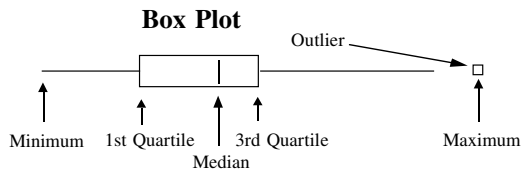
Press **ZOOM**, then press **9**, for 9:ZoomStat. The five number summary can be found by pressing the **TRACE** key and using the **▶** and **◀** arrows. Press the **▲** and **▼** arrows to change between TEAM1 and TEAM2. The five number summary for TEAM1 is .163, .218, .244, .259, .343. The five number summary for TEAM2 is .128, .198, .231, .286, .297. Notice the batting average .343 is an outlier for TEAM1. Comparisons can be made between box plots.



Box Plots

Let's Practice

Mode Check. Press **MODE**. Make sure settings are as shown. If you need to change a setting, highlight the change using the arrow keys and press **ENTER**. Press **2nd QUIT** or **CLEAR** to return to the home screen. To erase any previous work, press **CLEAR**.



- Company A and Company B each produce a 75-watt light bulb. They each advertise their light bulb will last an average (mean) of 750 hours. Compare the light bulbs using box plots.

Company A 705 712 770 780 764 757 749 748 758 705 753
 701 772 754 715 705 723 793 770 781 792 793

Company B 821 815 694 751 736 782 692 717 821 702 795
 816 715 721 671 821 688 675 761 806

How do the two different companies' products compare?

- Construct a box plot using the data generated by how many years each U.S. president lived after their inauguration. What is the five number summary?

President	Years	President	Years	President	Years
Washington	10	Fillmore	24	T. Roosevelt	18
John Adams	29	Pierce	16	Taft	21
Jefferson	26	Buchanan	12	Wilson	11
Madison	28	Lincoln	4	Harding	2
Monroe	15	Andrew Johnson	19	Coolidge	9
J. Q. Adams	23	Grant	17	Hoover	36
Jackson	17	Hayes	16	F. Roosevelt	12
VanBuren	25	Garfield	0	Truman	28
Harrison	0	Arthur	7	Kennedy	3
Tyler	20	Cleveland	24	Eisenhower	16
Polk	3	Harrison	12	L. Johnson	9
Taylor	1	McKinley	4	Nixon	2

- Construct a box plot using this test data.

Test Score	Frequency
100	1
96	1
92	2
87	1
85	3
82	4
75	6
72	3
65	1
61	2
57	1
52	1
51	1