



# The Ordinary Man

## Overview

Students will estimate the heights of various celebrities in inches. They will convert inches to feet, and they will interpret the calculator results to express the estimated heights in feet and inches. Finally, they will graph the estimated heights and actual heights of the celebrities.

## Math Concepts

- multiple representation of numbers patterns
- estimation
- fractions and mixed numbers
- measurement
- conversions
- graphing

## Materials

- TI-30XS MultiView™

## Activity

Begin with a discussion about estimation.

*Often, it is necessary for us to estimate. In the store, for instance, it makes more sense to estimate how much we've spent than to keep a running total using an exact calculation. Let's see how estimation and calculation work together.*

Show students how estimation is a good starting point and how checking those answers later using a calculator helps them verify their estimations.

*If you were shopping and needed to know how much money you had left to spend, it would be important to be able to do a quick estimation. For example, if you had \$20 and had a cart half-full of snacks, you could run through the prices, rounding to the nearest dollar or half dollar to come up with the best idea of what you'd spent.*

Now, give them an actual example so they can practice this concept.

*If you have a large bag of pretzels, two six-packs of soda, and a one-pound bag of candy, how much would you have left to spend?*

The students' estimations will vary depending on what they believe the prices of the items to be. Ask each to do his/her own mental calculation. Discuss results briefly, including a discussion of whether they used fractions, decimals, or whole numbers.

Move on to estimating heights and whether to use fractions, decimals, or whole numbers.

*Think of a professional basketball player. More likely than not, would that person be tall or short? What would be a height for the stereotypical basketball player?*

Note how the students answer. Point out that they have used feet (e.g., 7 ft), or feet and inches (e.g., 6 ft 8 in.), or a mixed number (e.g.,  $6\frac{1}{2}$  ft). Likely, no student described height in inches or with a decimal. Discuss that.



# The Ordinary Man

*If someone is 89 inches tall, how tall is that in feet? Mentally estimate or guess. How would we convert? How many inches are there in a foot?*

Discuss how to convert from inches to feet and inches, using the fact that 12 inches = 1 foot. Show the above example on the board, ending up with the decimal 7.416666666.

*First, how close was your estimate? Why did you estimate the number you did? Now, we normally don't say someone is about 7.42 feet tall. What does that mean? By converting this decimal approximation, we can learn this person's exact height.*

Show how the calculator can be used to convert decimals to fractions.

*There are many features on the TI-30XS MultiView scientific calculator that make it easy to convert between decimals and fractions, as well as mixed numbers. Use your calculator to see how tall the two people are. Since there are 12 inches in a foot, we can see that  $\frac{5}{12}$  of an inch represents 5 inches. This person is 7 feet 5 inches tall.*

Introduce the “Ask-x” feature.


*By using the functionality of the calculator, we can make multiple conversions much easier to handle. What is the process for converting 89 inches into 7 feet 5 inches?*

1. Divide by 12 to get a decimal.
2. Convert to a mixed number.
3. Ensure that the denominator is 12, and then analyze the height.

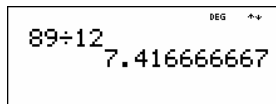
*The ‘ask-x’ feature allows us to input these commands once and then input any x-values (in inches) we choose.*


Remind students to be cautious—fractions may be returned with denominators of 2, 3, 4, or 6 since the calculator automatically simplifies. They need to recognize that  $5\frac{1}{4}$

represents 5 feet 3 inches since  $\frac{1}{4}$  foot is 3 inches.

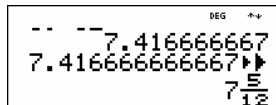
 Follow these steps:


1. Press 89  $\div$  12 **enter**.
2. The screen should display this:



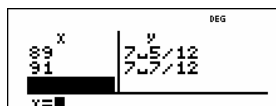
 Follow these steps:

1. Press **2nd** [ $\frac{a}{b} \leftrightarrow U_a^n$ ].
2. Pressing **enter** will show this:



 Follow these steps:

1. Press **table** [ $x_{abc}^{yzt}$ ]  $\div$  12.
2. Then press **2nd** [ $\frac{a}{b} \leftrightarrow U_a^n$ ].
3. Press **enter** to store the formula.
4. Use arrow keys to highlight “Ask-x,” press **enter**, then **enter**.
5. Now input x-values (in inches), and output will be a mixed number that represents feet and inches.
6. The screen should display this:



# The Ordinary Man

Name \_\_\_\_\_

Date \_\_\_\_\_



1. Estimate the height of each celebrity or public figure. If you are not sure who the people are or how tall they are, use the Internet to find pictures of them standing next to others, standing by a door, etc., so you have a reference point. Use feet and inches (example: 6 ft 2 in.). Rewrite the celebrities in order from shortest to tallest, based upon your estimations.

Name	Estimated height
Shania Twain	
Sylvester Stallone	
Prince William	
Sammy Sosa	
Queen Elizabeth	
Brad Pitt	
Oprah Winfrey	
Madonna	
Tiger Woods	
Shaquille O'Neal	
Hillary Clinton	
Fergie (of Black Eyed Peas)	
Nick Lachey	
Rudy Giuliani	


Shortest to tallest




# The Ordinary Man

Name \_\_\_\_\_

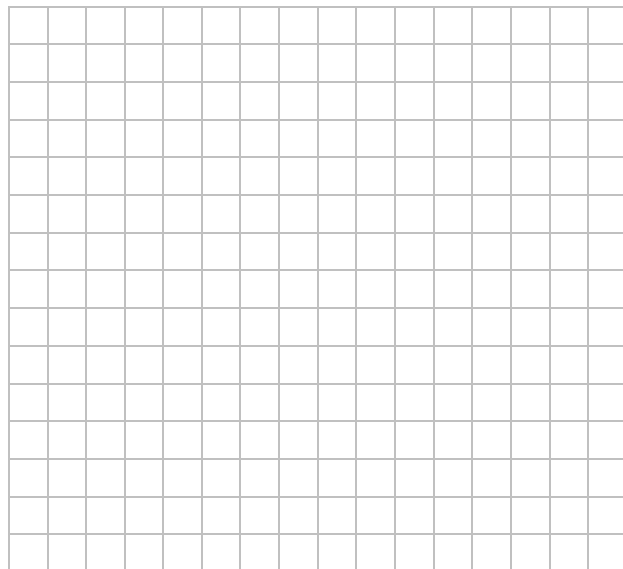
Date \_\_\_\_\_



2. Now, given the actual heights of the celebrities in inches, use the “Ask- $x$ ” feature of your calculator to determine their heights in feet. Problems with  beside them should be done mentally. Transfer your estimated heights from the table on p.1, and then find your measure of error by subtracting.

Name	Estimated height	Actual height in inches	Actual height in feet and inches	Measure of error (actual height – estimated height)
Shania Twain		64		
Sylvester Stallone		67		
Prince William		74		
 Sammy Sosa		72		
Queen Elizabeth		65		
 Brad Pitt		73		
Oprah Winfrey		67		
Madonna		66		
 Tiger Woods		74		
Shaquille O’Neal		85		
Hillary Clinton		66		
Fergie (of Black Eyed Peas)		62		
Nick Lachey		70		
Rudy Giuliani		63		

3. Construct a scatter plot below. Plot your estimates on the  $y$ -axis, and plot the actual heights on the  $x$ -axis. Label your axes and the scale you use.




4. What would the above scatter plot have looked like if you had estimated every person’s height correctly? Use a different color/mark to indicate those points. Describe how your initial set of points compares with the second set.



# The Ordinary Man

## Answer Key

- Answers will vary.
- Now, given the actual heights of the celebrities in inches, use the “Ask- $x$ ” feature of your calculator to determine their heights in feet. Problems with  beside them should be done mentally. Transfer your estimated heights from the table on p.1, and then find your measure of error by subtracting.

Name	Estimated height	Actual height in inches	Actual height in feet and inches	Measure of error (actual height – estimated height)
Shania Twain	varied	64	5 ft 4 in.	varied
Sylvester Stallone	varied	67	5 ft 7 in.	varied
Prince William	varied	74	6 ft 2 in.	varied
Sammy Sosa	varied	72	6 ft	varied
Queen Elizabeth	varied	65	5 ft 5 in.	varied
Brad Pitt	varied	73	6 ft 1 in.	varied
Oprah Winfrey	varied	67	5 ft 7 in.	varied
Madonna	varied	66	5 ft 6 in.	varied
Tiger Woods	varied	74	6 ft 2 in.	varied
Shaquille O’Neal	varied	85	7 ft 1 in.	varied
Hillary Clinton	varied	66	5 ft 6 in.	varied
Fergie (of Black Eyed Peas)	varied	62	5 ft 2 in.	varied
Nick Lachey	varied	70	5 ft 10 in.	varied
Rudy Giuliani	varied	63	5 ft 3 in.	varied

- Construct a scatter plot below. Plot your estimates on the y-axis, and plot the actual heights on the x-axis. Label your axes and the scale you use.

Graphs will vary, depending upon students’ estimates of the people’s heights. The scales will also vary between inches (65 in.) and feet and inches (5 ft 5 in.).

- What would the above scatter plot have looked like if you had estimated every person’s height correctly? Use a different color/mark to indicate those points. Describe how your initial set of points compares with the second set.

If every estimate was correct, the points would have fallen along the line  $y = x$ . Students may not state the equation of the line but may indicate “a line that goes up at a 45° angle” or something similar.