Mean, Median, Mode (Part 1)

Extend Your Learning
Answers and Explanations

The 2008 U.S. Olympic Men's Basketball team won the gold medal in Beijing. The team consisted of the following 12 men.

U.S.A. Team Roster

Name	Number	Position	Height in Centimeters	Height in Feet and Inches	Weight in Pounds
Carlos Boozer	4	F	206 cm	6'9"	266 lbs.
Jason Kidd	5	G	194 cm	6'4"	210 lbs.
LeBron James	6	F	203 cm	6'8"	250 lbs.
Deron Williams	7	G	191 cm	6'3"	205 lbs.
Michael Redd	8	G	199 cm	6'6"	215 lbs.
Dwyane Wade	9	SG	193 cm	6'4"	216 lbs.
Kobe Bryant	10	G	199 cm	6'6"	205 lbs.
Dwight Howard	11	C	211 cm	6'11"	265 lbs.
Chris Bosh	12	P/C	208 cm	6'10"	230 lbs.
Chris Paul	13	PG	183 cm	6'0"	175 lbs.
Tayshaun Prince	14	F	206 cm	6'9"	215 lbs.
Carmelo Anthony	15	SF	203 cm	6'8"	230 lbs.

Source: http://www.usabasketball.com/news.php?news_page=2008msntroster

1. Determine the mean height of the players in centimeters.

   Add the height of each player and divide by 12, the number of players.

   $206 + 194 + 203 + 191 + 199 + 193 + 199 + 211 + 208 + 183 + 206 + 203 = 2396$ cm

   $2396 \text{ cm} \div 12 = 199.\overline{6}$ cm

   The mean height is approximately 200 cm.

2. Determine the mean height of the players in feet and inches.

   The mean height will be 6 feet plus the mean of the inches. Add the inches from each player's height and divide by 12, the number of players. The mean height is $6'6\frac{1}{2}"$, or approximately 6'7".

   $9 + 4 + 8 + 3 + 6 + 4 + 6 + 11 + 10 + 0 + 9 + 8 = 78"$ $\quad 78" \div 12 = 6.5"$ or $6\frac{1}{2}"$

   A second way to determine the mean height is to convert each player's height from feet and inches to just inches. Then add the heights, divide by 12, and convert the answer back to feet and inches. The mean height is 78.5", which is $6'6\frac{1}{2}"$ or approximately 6'7".

   $81 + 76 + 80 + 75 + 78 + 76 + 78 + 83 + 82 + 72 + 81 + 80 = 942"$ $\quad 942" \div 12 = 78.5"$

3. Which unit of measurement was easier to work with when determining the mean? Explain your reasoning.
   Answers vary based on personal preferences. If you converted feet and inches to just inches, using centimeters was probably quicker. If you did not convert feet and inches to just inches, using centimeters involved working with larger numbers and was probably more time consuming.

4. Determine the median height of the players in centimeters.
   Since there is an even number of basketball players, the median height is halfway between the two middle heights. The median is 201 cm, which is halfway between 199 cm and 203 cm.

   183 cm 191 cm 193 cm 194 cm 199cm 199 cm 203 cm 203 cm 206 cm 206 cm 208 cm 211 cm

5. Determine the median height of the players in feet and inches.
   Since there is an even number of basketball players, the median height is halfway between the two middle heights. The median is 6'7", which is halfway between 6'6"and 6'8".

   6'0" 6'3" 6'4" 6'4" 6'6" 6'6" 6'8" 6'8" 6'9" 6'9" 6'10" 6'11"

6. The website showing this data reports the average height of the players is 200 cm and 6'7". Which value – mean, median, or mode – do you think they are using to report the average? Explain your reasoning.
   Using centimeters, the median height of the players is 201 cm and the mean height of the players is 200 cm. Using feet and inches, the median height of the players is 6'7" and the mean height is also 6'7", rounded to the nearest inch. The website must be using the mean to report average because the average height is reported as 200 cm rather than 201 cm.

7. Determine the median weight of the players in pounds.
   Since there is an even number of basketball players, the median weight is halfway between the two middle weights. The median is 215.5 pounds, which is halfway between 215 pounds and 216 pounds.

   175 lbs. 205 lbs. 205 lbs. 210 lbs. 215 lbs. 215 lbs. 216 lbs. 230 lbs. 230 lbs. 250 lbs. 265 lbs. 266 lbs.

8. Mr. Smith's class determined the mean weight of the players in pounds. At least one student gave each of the answers listed below. Without computing the mean weight, determine which answer is correct. Explain your reasoning.

   188.5 lbs. 200 lbs. 223.5 lbs. 255 lbs.

   The first two answers, 188.5 lbs. and 200 lbs., do not make sense because they are too small. Think about equalizing the weights among the 12 players. If you subtract weight from each player over 200 pounds, so that they weigh exactly 200 pounds, and add the subtracted weight to the 175-pound player, he will weigh a lot more than 200 pounds.

   The last answer of 255 pounds does not make sense because it is too large. Again, think about equalizing the weights among the 12 players. If you subtract weight from the 265-pound player and 266-pound player to make their weights equal 255 pounds, you only have 21 pounds to distribute to the other players. That is not enough weight to make each player weigh 255 pounds.

   There is only one answer that makes sense, 223.5 pounds, and it is the mean weight of the players.