

Rounding and Significant Figures

Item 1: Buses

A school wants to take 236 students on a school excursion and each bus will hold 28 students. They divide 236 by 28 and get 8.42857. Should they order 8.42857 buses?

Item 2: Robbers

A witness told police that the bank robber is about 6 foot tall. The police put out a description for a man who is 182.88cm tall.

Item 3: Parking the car

How close to a fire hydrant can you park a car? The Victorian traffic rules (1995) state that it is not permitted to park within 1 metre of a fire hydrant, within 3 metres of a letter box, within 9 metres of the departure side of a bus stop or within 18 metres of the approach side of a bus stop. (Victorian Traffic Handbook, Vicroads, 1995.) Does it assume that people can estimate distances to the nearest 1 metre? When ought a police officer book you?

Item 4: Cutting String

- a) A 12m length of string was cut into 3 equal pieces, so each piece was 4 m long.
- b) A 14m length of string was cut into 3 equal pieces, so each piece was 4.666666667 m long.

Item 5: Strange but True

a) When Mount Everest's height was carefully calculated to the nearest foot they found that it was exactly 29 000 feet. Usually a number written like this (with zeros) indicates that the measurement was made to the nearest thousand feet, and that the actual height is somewhere between 28 1/2 thousand and 29 1/2 thousand feet. Rather than convey this false message, it was decided to record the height as 29 002 feet, indicating the level of accuracy of the measurement. It is ironic that in an attempt to convey the degree of accuracy, they actually introduced a deliberate error!

b) Sainsbury's recipe for lentil and tomato soup includes 1 large onion and 397-gram of chopped tomatoes. The vagueness of one of the masses (the large onion) contrasts bizarrely with the extreme precision of the other, especially since Sainsbury's sells 400 gm cans of tomatoes! The measurement 397 grams implies it is accurate to the nearest 1 gm. Giving a measurement of 400 grams instead would imply less accuracy is required - very sensibly. (Source: New Scientist, 7 Feb 1998, p 63).

Item 6: When is 1 cm 0.3937 inch?

In the following letter published in New Scientist, the inappropriate conversion of 1cm to 0.3937 inches is discussed:

"Talking of excessive precision..., when I was a child, my father had an English translation of a manual on violin playing by the great Hungarian-German teacher Carl Flesch. It told budding violinists to lift their fingers 0.3937 inches from the fingerboard. I still have occasional visions of music students trying to measure this with micrometers." (Source: Kenneth Goodare, Letters, New Scientist 2 May, 1998, p53)

Item 7: When is 32/64 1/2?

In this letter published in New Scientist, the topic is the precision implied by the way the number is written:

"If you look at Charles Darwin's notebooks, you find meticulously recorded measurements such as 32/64 inch. As a schoolboy I would have been taught to simplify this to 3 1/2 inch, one half inch being preferred to the cumbersome thirty-two sixty-fourths of an inch. However, Darwin reorded the length in sixty-fourths to indicate the level of precision of his measurements." (Source: John Aitken, Letters, New Scientist 2 May, 1998, p53).