1 Rounding Numbers

Question: **What is 14 489 to the nearest 1000?**

Misconception	Correct
To obtain the answer, round to the nearest 10, 100 and then 1000; thus: 14 489 to the nearest 10 is 14 490, 14 490 to the nearest 100 is 14 500, 14 500 to the nearest 1000 is 15 000. Hence: the misconception leads to the incorrect answer, 15 000.	The answer must be either 14 000 or 15 000, and since $$14\,489 - 14\,000 = 489,$$ whilst $$15\,000 - 14\,489 = 511,$$ clearly 14 489 is nearer to 14 000 than to 15 000. Hence: the correct answer is 14 000.

Further Explanation

The correct explanation above, that 14 489 is nearer to 14 000 than to 15 000, is clear-cut; but why is the 'misconceived' method wrong?

This is best illustrated by taking another example and putting it into context.

Two stations, A and B, are 500 metres apart:

You stand between the stations, 245 m away from A and 255 m from B and you want to walk to the nearest station. Naturally you turn left and walk 245 m.

But now imagine there are five trains parked between the stations, each train 100 m long, and each divided into 4 carriages of equal length.
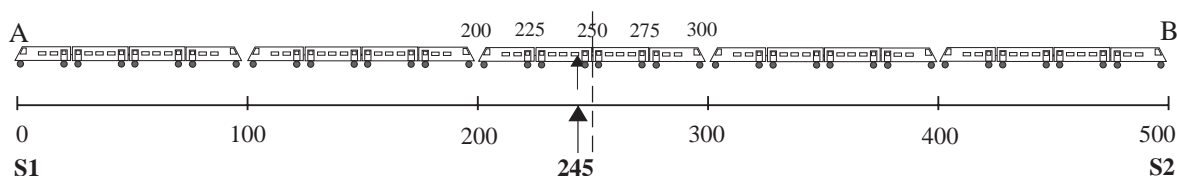
Your position, 245 m away from A, is now 20 m along the second carriage of the third train, and you decide to find your way to the nearest station by first asking which is the nearest *carriage-end* (the one on the right, 250 metres from A).

Having moved there, you then seek the nearest *end of the train*, which (as, by convention, we round mid-points *up)* is to the right at 300 metres from A. From there finally, you go to the nearest *station*, and this time arrive at B.

Clearly the result is wrong. Why?

Because when you want to find the nearest *station*, the questions about the nearest *carriage-end* and the nearest *train end* are irrelevant. Doing it this way might not matter in some cases, but here it does. The unnecessary interim steps move you away from your starting point, and here, in the wrong direction.

Another instructive point: this exercise provides an opportunity to distinguish between an arbitrary convention (i.e. which way to go from the middle) and a reasoned choice (i.e. the correct approach to round).

Follow-up Exercises

1. Round the following numbers to the nearest thousand:

   (a)   12 762

   (b)   9456

   (c)   493

   (d)   1488

2. Round the following numbers to the nearest hundred:

   (a)   749

   (b)   1547

   (c)   981

   (d)   2748

3. Round the following numbers to the nearest ten thousand:

   (a)   14 876

   (b)   24 998

   (c)   278 376

   (d)   74 669

Answers

1.	(a)	13 000	(b)	9 000	(c)	0	(d)	1000
2.	(a)	700	(b)	1500	(c)	1000	(d)	2700
3.	(a)	10 000	(b)	20 000	(c)	280 000	(d)	70 000