Test answers - Place value, ordering and rounding

Year: Year 7 · Duration: 45 minutes · /20

Answer to Question 1 (4 marks)

a. Two million is 2 000 000, forty thousand is 40 000 and six is 6. Add them: **2 040 006**. Zeros are needed to hold the empty hundreds and tens places. (1 mark)
b. In 6 305 000 the 6 is in the millions column, so its value is **6 000 000** (six million). (1 mark)
c. Multiplying by 1 000 moves every digit three places to the left: $4.07 \times 1000 =$**4 070**. (1 mark)
d. Give every number three decimal places: 0.450, 0.405, 0.500, 0.054. Compare digit by digit from the left: **0.054, 0.405, 0.45, 0.5**. (1 mark)

In (d), 0.405 is smaller than 0.45 because its hundredths digit is 0 against 5.

Answer to Question 2 (4 marks)

a. 7 849 lies between 7 800 and 7 900. The deciding digit is the tens digit, 4, which is less than 5, so round down: **7 800**. (1 mark)
b. For 2 decimal places look at the third decimal digit. In 0.0763 it is 6, which is 5 or more, so 0.07 rounds up to **0.08**. (1 mark)
c. For 1 decimal place look at the second decimal digit. In 48.35 it is 5, so round up: **48.4**. (1 mark)
d. The first two significant figures of 134 509 are 1 and 3. The next digit is 4, so round down. Zeros keep the size of the number: **130 000**. (1 mark)

Writing 13 for part (d) loses the mark because the place value has changed.

Answer to Question 3 (4 marks)

a. Round each number to 1 significant figure: 49.2 becomes 50, 5.1 becomes 5 and 0.52 becomes 0.5 (1 mark). The top is $50 \times 5 = 250$ (1 mark). Dividing by 0.5 is the same as doubling, so $250 \div 0.5 =$**500** (1 mark).
b. A calculator gives $\dfrac{250.92}{0.52} \approx 482.5$. The estimate is **bigger**. The denominator 0.52 was rounded down to 0.5, and dividing by a smaller number gives a larger answer. 49.2 was also rounded up to 50, which makes the top larger. (1 mark)

The estimate is within about 4% of the exact value, close enough to spot a key-pressing mistake.

Answer to Question 4 (4 marks)

a. £1 235.50 is nearer to £1 200 than to £1 300, and £2 480 is nearer to £2 500 than to £2 400. The rounded values are **£1 200** and **£2 500**. (1 mark)
b. They saved about £1 200 in 6 months, so the estimate is $1200 \div 6 =$**£200** per month. (1 mark)
c. Exactly: $1235.50 \div 6 = 205.9166\ldots$. The third decimal digit is 6, so round up to the nearest penny: **£205.92**. (1 mark)
d. $2480 \div 205.92 = 12.04\ldots$ months. Twelve months would not quite be enough, so round up to **13 months**. (1 mark)

Rounding down in (d) would leave the family a little short of the holiday price.

Answer to Question 5 (4 marks)

a. 54 600 000 is **fifty-four million, six hundred thousand** kilometres. (1 mark)
b. The first significant figure is the 5 in the ten-millions column. The next digit is 4, so round down: **50 000 000** km. (1 mark)
c. Time = distance ÷ speed. Using the rounded distance: $50\,000\,000 \div 20\,000 = 5\,000 \div 2 =$**2 500 hours**. (1 mark)
d. Exactly: $54\,600\,000 \div 20\,000 = 2\,730$ hours. There are 24 hours in a day, so $2730 \div 24 = 113.75$ days, which is about **114 days** to the nearest day. (1 mark)

The estimate of 2 500 hours is lower than the exact 2 730 hours because the distance was rounded down, by roughly 4.6 million km.