Grade 5 Unit 1 quiz 1: Thousandths: reading, writing and expanded form, Rounding decimals, Powers of ten (answer key)

8 questions, 21 points

ANSWERS AT A GLANCE

1. 3.603 grams
2. 3.42 grams
3. No. 0.35 ≈ 0, because the tenths digit is 3.
4. (a) 9.3 (b) 1 (c) 5.10 (d) 31.5
5. 29
6. (a) forty and seventy-three thousandths (b) 60.805 (c) $\frac{1}{100} + \frac{6}{1000}$
7. (a) seven hundredths of a millimeter; seven thousandths of a millimeter (b) 10 threads
8. $4 \times 10^4 + 2 \times 10^2 + 5 \times 10^0$; the number is 40,205

WORKED SOLUTIONS

1. A science class has brass weights of 1 gram, 0.1 gram, 0.01 gram and 0.001 gram. To balance a key, they use 3 one-gram weights, 6 tenth-gram weights and 3 thousandth-gram weights. They use no hundredth-gram weights. How many grams does the key weigh? (2 points)

ANSWER

3.603 grams

SOLUTION

Put each count in its place: 3 ones, 6 tenths, 0 hundredths and 3 thousandths. The 0 holds the hundredths place, so the 3 lands in the thousandths place.

The key weighs 3.603 grams. Check: 3 + 0.6 + 0.003 = 3.603.

SCORING

1 point for putting the three counts in the ones, tenths and thousandths places. 1 point for 3.603 grams with the placeholder zero in the hundredths place.

2. In science class, a scale shows that a smooth rock has a mass of 3.418 grams. The class chart lists every mass to the nearest hundredth of a gram. What mass goes on the chart? (2 points)

ANSWER

3.42 grams

SOLUTION

The neighbor hundredths are 3.41 and 3.42, with halfway mark 3.415. The digit just after the hundredths place is the thousandths digit, 8. A digit from 0 to 4 keeps the lower neighbor, and a digit from 5 to 9 takes the upper one. So 3.418 ≈ 3.42 grams.

3. Omar rounds 0.35 to the nearest whole number. He says, "The last digit is 5, and 5 rounds up, so the answer is 1." Is Omar right? Explain. (2 points)

ANSWER

No. 0.35 ≈ 0, because the tenths digit is 3.

SOLUTION

To the nearest whole number, the neighbors of 0.35 are 0 and 1, and the halfway mark is 0.5. The digit that decides is the one just after the ones place, the tenths digit, which is 3. So 0.35 is

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below halfway and 0.35 ≈ 0. The 5 is in the hundredths place, and it only matters when rounding to the nearest tenth.

SCORING

1 point for the answer 0 (Omar is wrong); 1 point for naming the tenths digit 3 (or the halfway mark 0.5) as what decides.

4. Round each number to the place named. (4 points)

(a) 9.274 to the nearest tenth

(b) 0.618 to the nearest whole number

(c) 5.096 to the nearest hundredth

(d) 31.45 to the nearest tenth

ANSWER

(a) 9.3 (b) 1 (c) 5.10 (d) 31.5

SOLUTION

(a) The neighbors are 9.2 and 9.3. The hundredths digit is 7, so 9.274 ≈ 9.3.

(b) The neighbors are 0 and 1. The tenths digit is 6, so 0.618 ≈ 1.

(c) The neighbors are 5.09 and 5.10, because ten hundredths make a tenth. The thousandths digit is 6, so 5.096 ≈ 5.10. The zero stays to show the hundredths place.

(d) 31.45 is exactly halfway between 31.4 and 31.5. Halfway rounds up, so 31.45 ≈ 31.5.

SCORING

1 point for each correct answer. In (c), 5.1 without the zero earns the point only if the work shows 5.10.

5. What number goes in the box? $\square \times 10^2 = 2{,}900$ (2 points)

ANSWER

29

SOLUTION

Multiplying a whole number by 10^2 writes 2 zeros after it. The number 2,900 ends in 2 zeros, so take those zeros off. The missing number is 29.

Check: $29 \times 10^2 = 2{,}900$.

6. (3 points)

(a) Write 40.073 in word form.

(b) Write sixty and eight hundred five thousandths in standard form.

(c) Write 0.016 in expanded form with fractions.

ANSWER

(a) forty and seventy-three thousandths (b) 60.805 (c) $\frac{1}{100} + \frac{6}{1000}$

SOLUTION

(a) The whole part is forty. The digits after the point, 073, are the number 73, ending in the thousandths place: forty and seventy-three thousandths.

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(b) "And" marks the point, so the whole part is 60. Eight hundred five thousandths fills three places: 805. The number is 60.805.

(c) 0.016 has 0 tenths, 1 hundredth and 6 thousandths: $\frac{1}{100} + \frac{6}{1000}$. Check: 0.01 + 0.006 = 0.016.

SCORING

1 point for each part: (a) the words with "and" only at the point, (b) 60.805, (c) $\frac{1}{100} + \frac{6}{1000}$ (the zero tenths term may be shown or left out).

7. A strand of hair is about 0.07 mm thick. A thread of spider silk is about 0.007 mm thick. (3 points)

(a) Write each thickness in word form.

(b) How many silk threads side by side are as thick as one hair? Explain using place value.

ANSWER

(a) seven hundredths of a millimeter; seven thousandths of a millimeter (b) 10 threads

SOLUTION

(a) 0.07 ends in the hundredths place: seven hundredths. 0.007 ends in the thousandths place: seven thousandths.

(b) The 7 in 0.07 is in the hundredths place. The 7 in 0.007 is one place to the right, in the thousandths place. Each place is ten times the place to its right, so 0.07 is 10 times 0.007. Ten threads of silk are as thick as one hair: 10 × 0.007 = 0.07.

SCORING

1 point for both word forms. 1 point for 10 threads. 1 point for a place value reason (one place apart, so ten times, or ten thousandths make a hundredth).

8. A number has 4 ten thousands, 2 hundreds and 5 ones. All its other places hold 0. Write the number in expanded form using powers of ten. Then write it as a number. (3 points)

ANSWER

$4 \times 10^4 + 2 \times 10^2 + 5 \times 10^0$; the number is 40,205

SOLUTION

The ten thousands place is four places left of the ones place, so it is 10^4. The hundreds place is 10^2 and the ones place is 10^0:

$$4 \times 10^4 + 2 \times 10^2 + 5 \times 10^0$$

To write the number, put a 0 in each place with no term, the thousands and the tens:

10^4	10^3	10^2	10^1	10^0
4	0	2	0	5

The number is 40,205.

SCORING

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> 2 points for the expanded form (1 point if one term has the wrong power of ten); 1 point for 40,205, with zeros in the thousands and tens places.

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