Grade 5 Unit 1 worksheet: Rounding decimals (answer key)

ANSWERS AT A GLANCE

1. (a) 6.4 (b) 16 (c) 0.5 (d) 3.15 (e) 22.1 (f) 9 (g) 0.08 (h) 48.0

2. (a) 3.5 meters (b) 3.52 meters

3. The hidden digit is 5: the number is 3.57.

4. (a) Sarah turned the 9 tenths into "10" tenths instead of regrouping: ten tenths make one, so the answer is 6.0. (b) Ben used the wrong digit. The digit just after the tenths place is the hundredths digit, 2, so the answer is 3.4.

5. (a) A is 6.83, B is 6.85, C is 6.89. (b) $6.83 \approx 6.8$, $6.85 \approx 6.9$, $6.89 \approx 6.9$

6. (a) Emma 12, Jack 13, Priya 12. (b) All three are 12.5. (c) Jack's plant is only 0.08 centimeter taller. (d) The two heights are on opposite sides of the halfway mark 12.5, so one rounds down and the other rounds up.

WORKED SOLUTIONS

1. Round each number to the place named.

(a) 6.38 to the nearest tenth

(b) 15.72 to the nearest whole number

(c) 0.461 to the nearest tenth

(d) 3.149 to the nearest hundredth

(e) 22.05 to the nearest tenth

(f) 8.503 to the nearest whole number

(g) 0.084 to the nearest hundredth

(h) 47.96 to the nearest tenth

ANSWER

(a) 6.4 (b) 16 (c) 0.5 (d) 3.15 (e) 22.1 (f) 9 (g) 0.08 (h) 48.0

SOLUTION

(a) The neighbors are 6.3 and 6.4. The hundredths digit is 8, which is 5 or more, so $6.38 \approx 6.4$.

(b) The neighbors are 15 and 16. The tenths digit is 7, so $15.72 \approx 16$.

(c) The neighbors are 0.4 and 0.5. The hundredths digit is 6, so $0.461 \approx 0.5$.

(d) The neighbors are 3.14 and 3.15. The thousandths digit is 9, so $3.149 \approx 3.15$.

(e) The neighbors are 22.0 and 22.1. The hundredths digit is 5 and nothing follows it, so 22.05 is exactly halfway. Halfway rounds up: $22.05 \approx 22.1$.

(f) The neighbors are 8 and 9. The tenths digit is 5, so 8.503 is past halfway and $8.503 \approx 9$.

(g) The neighbors are 0.08 and 0.09. The thousandths digit is 4, which is below 5, so $0.084 \approx 0.08$.

(h) The neighbors are 47.9 and 48.0, because one tenth more than 47.9 makes the 9 tenths a new one. The hundredths digit is 6, so $47.96 \approx 48.0$. Keep the zero: it is the tenths digit the question asks for.

2. Diego measures a garden hose. It is 3.518 meters long.

(a) Round the length to the nearest tenth.

(b) Round the length to the nearest hundredth.

ANSWER

(a) 3.5 meters (b) 3.52 meters

SOLUTION

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(a) The neighbor tenths are 3.5 and 3.6, and the halfway mark is 3.55. The digit just after the tenths place is the hundredths digit, 1. A digit from 0 to 4 keeps the lower neighbor, and a digit from 5 to 9 takes the upper one. So 3.518 ≈ 3.5.

(b) The neighbor hundredths are 3.51 and 3.52, and the halfway mark is 3.515. The thousandths digit, 8, decides in the same way. So 3.518 ≈ 3.52.

3. A number is written 3. ☐ 7. Its tenths digit is hidden under the box.

Rounded to the nearest whole number, it is 4. Rounded to the nearest tenth, it is 3.6.

What is the hidden digit? Explain how you know.

ANSWER

The hidden digit is 5: the number is 3.57.

SOLUTION

Rounded to the nearest whole number the number is 4, not 3. So its tenths digit is 5 or more: it is 5, 6, 7, 8 or 9.

To the nearest tenth, the hundredths digit 7 decides. A 7 is 5 or more, so the number rounds up to the tenth just above it. That tenth is 3.6, so the number lies between 3.5 and 3.6, and the hidden digit is 5.

Check: 3.57 ≈ 4, since the tenths digit is 5, and 3.57 ≈ 3.6, since the hundredths digit is 7. The digit 5 also passes the first test.

4. Two students made mistakes rounding to the nearest tenth.

(a) Sarah rounds 5.97 and writes 5.10. Explain her mistake and give the correct answer.

(b) Ben rounds 3.428. He looks at the last digit, 8, and writes 3.5. Explain his mistake and give the correct answer.

ANSWER

(a) Sarah turned the 9 tenths into "10" tenths instead of regrouping: ten tenths make one, so the answer is 6.0. (b) Ben used the wrong digit. The digit just after the tenths place is the hundredths digit, 2, so the answer is 3.4.

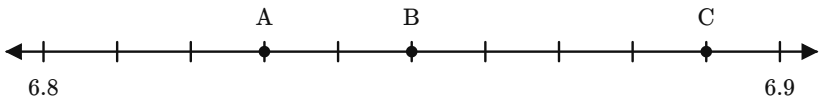
SOLUTION

(a) The neighbor tenths of 5.97 are 5.9 and one tenth more. One tenth more than 5.9 is not "5.10": the 9 tenths become 10 tenths, which make one whole, so the ones digit goes from 5 to 6 and the tenths digit is 0. The upper neighbor is 6.0. The hundredths digit is 7, so 5.97 ≈ 6.0. Sarah's 5.10 is less than 5.97, so it cannot be the tenth just above it.

(b) To round to the nearest tenth, look only at the digit right after the tenths place, the hundredths digit. In 3.428 it is 2, so the number is below the halfway mark 3.45 and 3.428 ≈ 3.4. The 8 is worth only 8 thousandths. It cannot lift 3.428 up to 3.45.

5. The number line runs from 6.8 to 6.9. There is a tick at every hundredth.

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(a) Write the number at each point A, B and C.

(b) Round each of the three numbers to the nearest tenth.

ANSWER

(a) A is 6.83, B is 6.85, C is 6.89. (b) 6.83 ≈ 6.8, 6.85 ≈ 6.9, 6.89 ≈ 6.9

SOLUTION

(a) From 6.8 to 6.9 there are ten equal steps, so each step is one hundredth. A is 3 steps past 6.8, so it is 6.83. B is 5 steps past, so it is 6.85. C is 9 steps past, so it is 6.89.

(b) The neighbor tenths are 6.8 and 6.9, and the halfway mark is 6.85, the middle tick.

A, at 6.83, is left of halfway, so 6.83 ≈ 6.8.

B sits exactly on the halfway mark. Halfway rounds up, so 6.85 ≈ 6.9.

C, at 6.89, is right of halfway, so 6.89 ≈ 6.9.

6. Emma, Jack and Priya each grow a bean plant. They measure the heights in centimeters:

Emma 12.46 Jack 12.54 Priya 12.45

(a) Round each height to the nearest whole number.

(b) Round each height to the nearest tenth.

(c) Jack says, "My plant is 1 centimeter taller than Emma's, because 13 − 12 = 1." Count up by hundredths from Emma's height to Jack's. How much taller is Jack's plant really?

(d) Explain why rounding made the difference look so big.

ANSWER

(a) Emma 12, Jack 13, Priya 12. (b) All three are 12.5. (c) Jack's plant is only 0.08 centimeter taller. (d) The two heights are on opposite sides of the halfway mark 12.5, so one rounds down and the other rounds up.

SOLUTION

(a) Each height is between 12 and 13, and the tenths digit decides. Emma: tenths digit 4, so 12.46 ≈ 12. Jack: tenths digit 5, so 12.54 ≈ 13. Priya: tenths digit 4, so 12.45 ≈ 12.

(b) Emma: the neighbors are 12.4 and 12.5, and the hundredths digit is 6, so 12.46 ≈ 12.5. Jack: the neighbors are 12.5 and 12.6, and the hundredths digit is 4, so 12.54 ≈ 12.5. Priya: 12.45 is exactly halfway between 12.4 and 12.5, and halfway rounds up, so 12.45 ≈ 12.5.

(c) Count up from 12.46: 12.47, 12.48, 12.49, 12.50, 12.51, 12.52, 12.53, 12.54. That is 8 hundredths, so Jack's plant is 0.08 centimeter taller, less than one tenth of a centimeter.

(d) Emma's height is just below the halfway mark 12.5 and Jack's is just above it. So to the nearest whole number one rounds down to 12 and the other rounds up to 13, even though the plants are almost the same height.

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