Explain Yourself!

I can solve reasoning problems by rounding numbers to a required degree of accuracy.

The Y5 class at Anywhere School have been learning about rounding numbers. Some of the children have solved reasoning problems using their rounding skills. Read the questions and their answers, then explain whether you agree or disagree with them, referring to rounding numbers.

Anya

Two numbers can be rounded to 150 to the nearest ten. Their sum is 301.

What could the numbers be?

Anya says, "The answer must be 147 and 154".

Do you agree with her?

Eric

Eric has rounded 57 638 to different degrees of accuracy.
Do you agree with all his answers?

57 638 to the nearest:

ten = 57 630	hundred = 57 600
thousand = 57 000	ten thousand = 50 000

Naomi

Which of these numbers rounds to 8 to the nearest whole number?

8.9	7.4	8.5	7.5

Naomi circles 7.5. Do you agree with her?

Yoshimi

Yoshimi rounds these numbers to the nearest hundred to estimate the answer to the calculation: 4534 - 2351

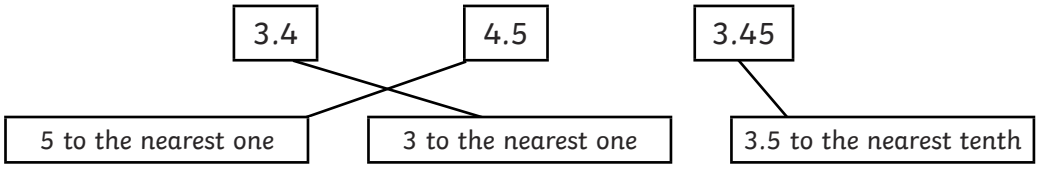
She writes:

4500- 2300 = 2200.

Do you agree with her estimation?

Thomas

Thomas matches these number cards with the rounding answers.



Do you agree with how he has matched them?

Kenneth

The difference between two numbers is 2.

When they are rounded to the nearest ten, the difference is ten.

What could the numbers be?

Kenneth thinks the numbers could be 21 and 31.

Do you agree with him?

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Anya

Two numbers have a difference of 540. Both numbers round to 5000 to the nearest thousand. What is the lowest possible pair of numbers that fit this description?

Anya says, "The lowest possible pair of numbers that fit this description are 4500 and 5040".

Do you agree with her?

Eric

Eric rounds 5.051 to the nearest whole number, the nearest tenth and the nearest hundredth.

Do you agree with all his answers?

5.051 to the nearest:

whole number = 6	tenth = 5.5	hundredth = 5.05

Naomi

These numbers all round to 43 100 to the nearest hundred.

43 068	43 143	43 091	43 105

Find another number that rounds to 43 100 to the nearest hundred and has a digit sum of 11. Naomi says, "43 211 has a digit sum of 11 and rounds to 43 100 to the nearest hundred." Do you agree with her?

Yoshimi

30 007	29 997

Both of these numbers round to 30 000 to the nearest ten thousand. Which of the numbers is closest to 30 000?

Yoshimi chooses 30 007.

Do you agree with her choice?

Thomas

Thomas matches these number cards with the rounding answers.

3.4	5 to the nearest one
4.5	3 to the nearest one
3.45	3.5 to the nearest tenth

Do you agree with how he has matched them?

Kenneth

Here are six number cards. Use five of the cards to complete the rounding description below.

9	2	0	7	1	8

___ . ___ ___ rounds to _____ to the nearest whole number.

Kenneth chooses 9, 0, 1, 7 and 8 to make 9.78 rounds to 10 to the nearest whole number. Do you agree with his choice?

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Anya

68	94	19	34

Anya chooses two of these cards. She adds the numbers on the two cards together, and rounds her answer to the nearest ten.

Her answer is 110.

Which two cards did Anya choose?

Eric

A five-digit decimal number rounds to 3000 to the nearest thousand, 3300 to the nearest hundred, 3250 to the nearest ten. Its middle digit is equal to the sum of its last two digits. What could the number be?

Eric thinks that the number could be 3252.3.

Do you agree with him?

Naomi

These numbers all round to 11 to the nearest whole number. Which of the numbers is closest to 11.1?

11.05	11.11	11.01	11.15

Naomi says "11.05 is nearest to 11.1 because it is only five hundredths away from 11.1." Do you agree with her?

Yoshimi and Jack

Yoshimi and Jack think of the same number. Yoshimi rounds it to the nearest ten and Jack rounds it to the nearest hundred.

The answer that Yoshimi gets is half of the answer that Jack gets.

Could their answers be right?

Thomas

A box contains 10 packs of pencils. In each pack, there are 7 pencils. The box costs £12. How much does one pencil cost to the nearest penny?

Thomas calculates that one pencil costs 17p.

Do you agree with his calculations and his rounding?

Kenneth

Here are six number cards. Use five of the cards to complete the rounding description below.

9	2	3	4	1	3

___ . ___ ___ rounds to _____ to the nearest tenth.

Kenneth uses the cards to make: 3.149 rounds to 3.2 to the nearest tenth. Do you agree with him?

Explain Yourself Answers

Anya

Anya could be right, because 147 and 154 both round to 150 to the nearest ten, and add up to 301.

However, there are also two other possibilities: 148 and 153, and 149 and 152.

Eric

Eric has got one of his answers right – 57 638 to the nearest hundred is 57 600.

However, his other answers have been rounded down when they should have been rounded up: 57 640 to the nearest ten, 58 000 to the nearest thousand and 60 000 to the nearest ten thousand.

Naomi

Naomi is right. 7.5 rounds up to 8 to the nearest whole number. 8.9 and 8.5 round up to 9, while 7.4 rounds down to 7.

Yoshimi

Yoshimi has rounded 4534 to the nearest hundred accurately, but she has rounded 2351 down to 2300 to the nearest hundred, when it should be rounded up to 2400.

The estimation should be:

4500 – 2400 = 2100.

Thomas

Thomas has matched the cards and statements accurately. 4.5 rounds up to 5, 3.4 rounds down to 3, and 3.45 rounds up to 3.5.

Kenneth

Kenneth can't be right, because the numbers he has chosen do not have a difference of 2.

Possible numbers could be 14 and 16, 24 and 26, 34 and 36, 44 and 46, and so on up to 94 and 96.

Explain Yourself Answers

Anya

Anya is correct. There are several possible numbers that fit the description, but the lowest possible pair of numbers is 4500 and 5040. Below 4500 the number would round down to 4000.

Eric

Eric has got one of his answers right – 5.051 to the nearest hundredth is 5.05.

However, his other answers are incorrect. 5.051 to the nearest whole number is 5. Eric may have seen the digit 5 in the hundredths place and mistakenly rounded up to 6.

5.051 to the nearest tenth is 5.1. Eric rounded up because of the 5 in the hundredths place, but accidentally rounded the 5 up instead of rounding the 0 in the tenths place up to 1.

Naomi

Naomi is incorrect. 43 212 has a digit sum of 12, and it rounds to 43 200 to the nearest hundred. A possible correct answer is 43 121.

Yoshimi

Yoshimi is incorrect. 30 007 is seven away from 30 000, whereas 29 997 is only three away from 30 000.

Thomas

Thomas is correct. 3.4 rounds to 3 to the nearest one as there are 4 tenths so he has to round down. 4.5 rounds to 5 to the nearest one because there are 5 tenths and he correctly rounded up. 3.45 to the nearest tenth would be 3.5 as there are 5 hundredths so he correctly rounded up.

Kenneth

Kenneth's choice is accurate. 9.78 does round up to 10 to the nearest whole number.

Explain Yourself Answers

Anya

Anya chose 94 and 19. These numbers add up to 113, which rounds down to 110 to the nearest ten.

Eric

Eric has found one of the possible answers for this problem. 3252.3 does round to 3000 to the nearest thousand, 3300 to the nearest hundred and 3250 to the nearest ten. Its middle digit is 5, which is equal to the sum of 2 and 3, its last two digits. Other possibilities include 3251.4, 3254.1, 3253.2 and 3250.5.

Naomi

Naomi is not correct. 11.05 is five hundredths away from 11.1, whereas 11.11 is only one hundredth away from 11.1.

Yoshimi and Jack

Jack and Yoshimi could be right. If they both started with 52, Yoshimi would round it to 50 to the nearest ten, and Jack would round it to 100 to the nearest hundred. Yoshimi's answer of 50 is half of Jack's answer of 100.

Thomas

Thomas' answer is accurate. To find the cost of each pack of pencils, divide the cost of the whole box by the number of packs. This is 12 divided by 10, which equals 1.2, or £1.20. To find the cost of each pencil, divide £1.20 by 7. This gives an answer of 0.1714285. Round this to two decimal places to find the answer to the nearest penny, giving an answer of 17p.

Kenneth

Kenneth's has not used the cards in the correct order. 3.149 rounds down to make 3.1 to the nearest tenth. He should have used the cards to make:

3.194 rounds to 3.2 to the nearest tenth.

Rounding Reasoning

I can solve reasoning problems by rounding numbers to a required degree of accuracy.

Rounding Reasoning 1

Ava thinks of two 3-digit numbers. They both round to 400 to the nearest hundred, and their sum is 780. Which numbers could Ava be thinking of?

Show your working out:

Ava

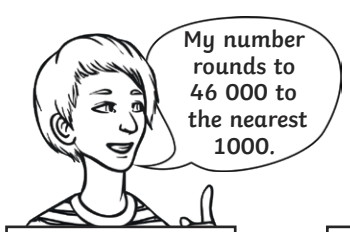
Answer

Ava's numbers:

Rounding Reasoning 2

These children each have one of these number cards.
Can you work out which child has which number card?

45 673	45 642	45 589



Oliver

Chelsea

Martin

Answer

Oliver: Chelsea: Martin:

Rounding Reasoning 3

Can you give a number that rounds to 9.83 to the nearest hundredth and has a digit sum of 24? Show your working out:

Answer

Number:

Rounding Reasoning Answers

Rounding Reasoning 1

Ava's numbers: Multiple answers possible, including 430 and 350, or 420 and 360.

Rounding Reasoning 2

Oliver: 45 673

Chelsea: 45 642

Martin: 45 489

Rounding Reasoning 3

Multiple answers possible, including 9.834 or 9.8322.