Reasoning and Problem Solving
Step 11: Negative Numbers

National Curriculum Objectives:

Mathematics Year 5: (5N5) Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero

Differentiation:

Questions 1, 4 and 7 (Reasoning)
Developing Identify incorrect calculations when using negative numbers in context to -10. Including number lines with marked scales with marked increments.
Expected Identify incorrect calculations when using negative numbers to -50. Including marked and unmarked number lines, with some increments given and the same start and end points e.g. -10 to 10.
Greater Depth Identify incorrect calculations when using negative numbers to -50. Including marked and unmarked number lines, where increments are greater than 1 and the start and end points are different e.g. -30 to 20.

Questions 2, 5 and 8 (Reasoning)
Developing Identify the halfway point between two numbers using their understanding of negative numbers in context to -10. Including number lines with marked scales with marked increments.
Expected Identify the halfway point between two numbers using their understanding of negative numbers to -50. Including marked and unmarked number lines, with some increments given and the same start and end points e.g. -10 to 10.
Greater Depth Identify the halfway point between two numbers using their understanding of negative numbers to -50. Including marked and unmarked number lines, where increments are greater than 1 and the start and end points are different e.g. -30 to 20.

Questions 3, 6 and 9 (Problem Solving)
Developing Solve problems using negative numbers to -10. Number lines with marked scales with marked increments given for support.
Expected Solve two-step problems using negative numbers to -50. Marked and unmarked number lines given for support, with some increments given and the same start and end points e.g. -10 to 10.
Greater Depth Solve multi-step problems using negative numbers to -50. Marked and unmarked number lines given for support, where the start and end points are different e.g. -30 to 20.

More Year 5 Place Value resources.

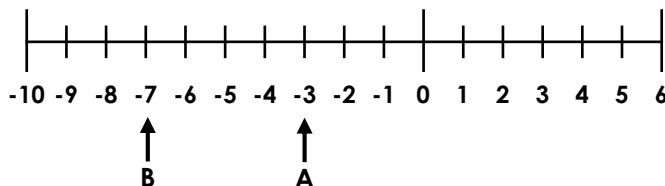## Did you like this resource? Don't forget to review it on our website.

Negative Numbers

1a. Jo has recorded each answer to the questions below on the number line.

> **A. 6 more than -9**

> **B. 5 subtract 14**

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

B ↑ (at -7) A ↑ (at -3)

Is she correct? Explain your answer.

R

1b. Bert has recorded each answer to the questions below on the number line.
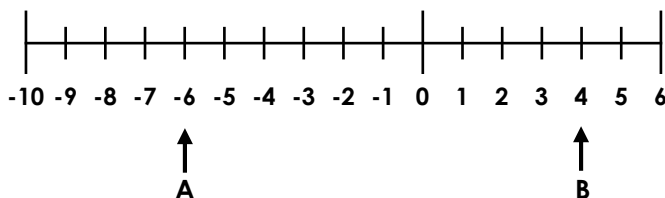
> **A. 3 subtract 9**

> **B. 8 more than -4**

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

B ↑ (at 4) A ↑ (at 6)
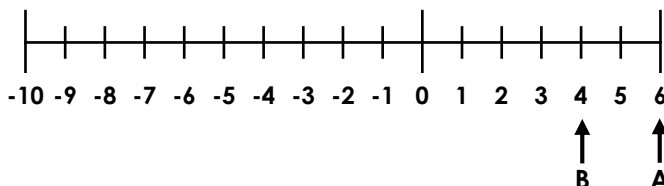
Is he correct? Explain your answer.

R

2a. Arty thinks that the number that lies halfway between A and B is 0.

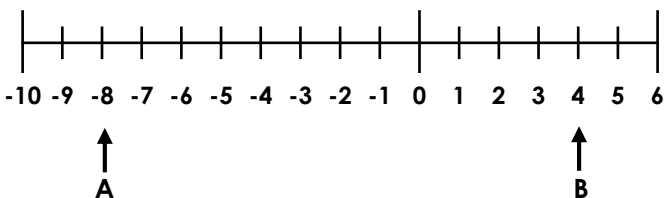-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

A ↑ (at -6) B ↑ (at 4)

Is he correct? Prove it.

R

2b. Punita thinks that the number that lies halfway between A and B is 0.

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6
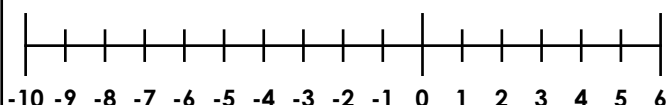
A ↑ (at -8) B ↑ (at 4)

Is she correct? Prove it.

R

3a. Isabel had £5 in her bank account. She spent £13 in the shop and she is now overdrawn. How much money does Isabel have in her bank account now?
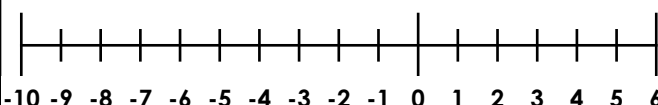
Use the number line below for support.

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

PS

3b. Sinead had £6 in her account. She paid her phone bill online but now she is overdrawn by £9. How much was her phone bill?
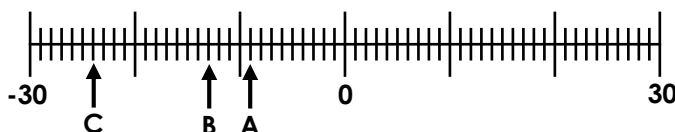
Use the number line below for support.

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

PS

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Reasoning and Problem Solving – Negative Numbers – Year 5 Developing

4a. Andy has recorded each answer to the questions below on the number line.

> **A. 14 more than negative 23**

> **B. Sixteen less than three**

> **C. 15 subtract 42**
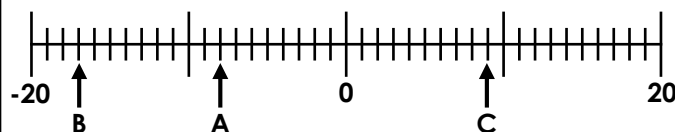
-30 C B A 0 30

Is he correct? Explain your answer.

☆ E
R

4b. Betty has recorded each answer to the questions below on the number line.

> **A. Fifteen less than seven**
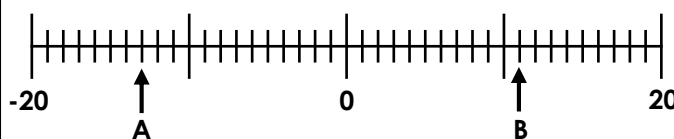
> **B. 4 more than negative 13**

> **C. The difference between 5 and -4**

-20 B A 0 C 20

Is she correct? Explain your answer.

☆ E
R

5a. Hannah thinks that the number that lies halfway between A and B is 0.
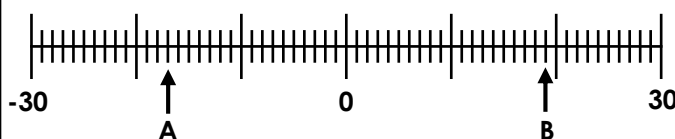
-20 A 0 B 20

Is she correct? Prove it.

☆ E
R

5b. Avneet thinks that the number that lies halfway between A and B is 2.

-30 A 0 B 30

Is he correct? Prove it.

☆ E
R

6a. Ben had £28 in his bank account. On Tuesday, his phone and broadband bills came out. His bank account is now -£16. If the phone bill was £25, how much was Ben's electricity bill?
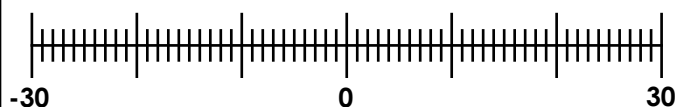
Use the number line below for support.

-30 0 30

☆ E
PS

6b. Hanin had £23 in her bank account. On Wednesday, she spent £16. On Thursday, she paid a £22 electricity bill. How much money does Hanin have in her bank account now?
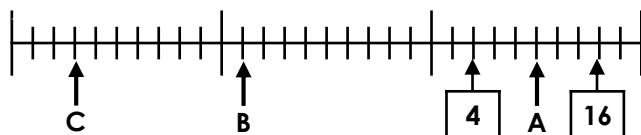
Use the number line below for support.

-30 0 30

☆ E
PS

7a. Ellie has recorded each answer to the questions below on the number line.

A. The difference between 2 and -8

B. 14 more than negative 32

C. Twenty-eight less than six
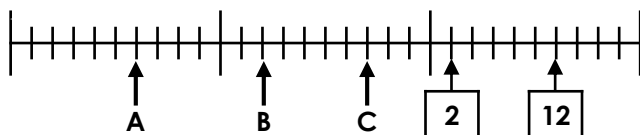
Is she correct? Explain your answer.

R

7b. Brian has recorded each answer to the questions below on the number line.

A. Thirty-six less than eight

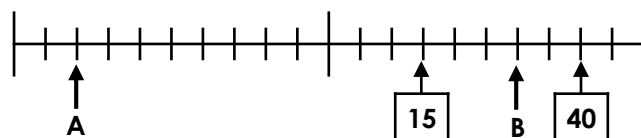B. The difference between 6 and -10

C. 32 more than negative 38

Is he correct? Explain your answer.

R

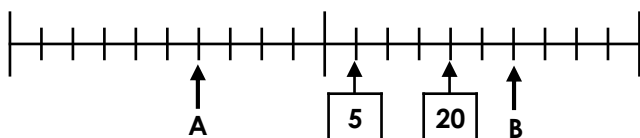**8a.** Hunter thinks that the number that lies halfway between A and B is -1.

Is he correct? Prove it.

R

8b. Annabel thinks that the number that lies halfway between A and B is 0.
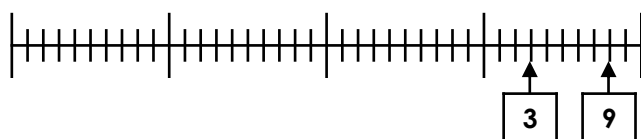
Is she correct? Prove it.

R

9a. Josh had £10 in his bank account. On Tuesday, his gas, phone and water bills came out. His bank account is now -£28. If the water bill was £12 and the phone bill was £17, how much was Ben's electricity bill?
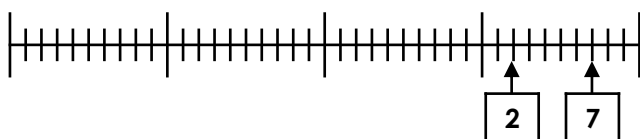
Use the number line below for support.

PS

9b. Chuan had £8 in his bank account. On Wednesday, he spent £16 and on Thursday, he spent £23. On Friday, he was refunded the money for a damaged top he'd returned. His bank balance is now -£13. How much was the refund?

Use the number line below for support.

PS

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Reasoning and Problem Solving – Negative Numbers – Year 5 Greater Depth

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Negative Numbers

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Developing

1a. Jo is incorrect because B should be pointing to -9.

2a. Arty is incorrect, as halfway between 4 and -6 is -1.

3a. -£8

Expected

4a. Andy is incorrect because C should be pointing to -27.

5a. Hannah is incorrect, as halfway between 11 and -13 is -1.

6a. £19

Greater Depth

7a. Ellie is incorrect because C should be pointing to -22.

8a. Hunter is incorrect, as halfway between 30 and -40 is -5.

9a. £9

Developing

1b. Bert is incorrect because A should be pointing to -6.

2b. Punita is incorrect, as halfway between 4 and -8 is -2.

3b. £15

Expected

4b. Betty is incorrect because B should be pointing to -9.

5b. Avneet is incorrect, as halfway between 19 and -17 is 1.

6b. -£15

Greater Depth

7b. Brian is incorrect because B should be pointing to 16.

8b. Annabel is incorrect, as halfway between 30 and -20 is 5.

9b. £18

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Reasoning and Problem Solving – Negative Numbers ANSWERS