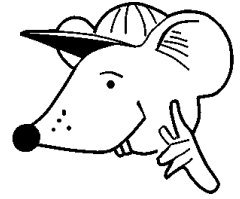


MATHEMATICS



N.S. Yr. 5 P.15

Recognise and order negative numbers.

Equipment

Paper, pencil.

Desirable for observation: thermometers and meters that show negative quantities.

MathSphere

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Concepts

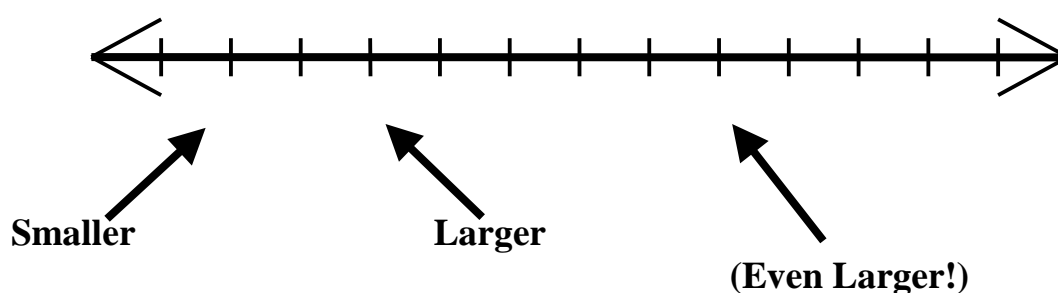
It is important with children to distinguish between using the 'minus' sign to perform subtraction and using it to indicate a negative number (ie a number less than zero). In the good old days, we used the word 'minus' for both concepts and this led to great confusion such as 'two minuses make a plus' (but only, unfortunately, in some circumstances). In the early days it is as well to avoid the use of 'minus' and use the words 'subtract' and 'negative', although sometimes in Key Stage 2 SATs the word 'minus' is used in the mental arithmetic test and 'minus' is in general use for temperature readings, of course.

When used to indicate a negative number, the sign may be written level with the middle of the number, as in -4 , and sometimes it is raised, as in $^{-}5$. Both forms are used in MathSphere units to familiarise children with the two types of usage.

Larger or Smaller

When trying to decide which of two numbers is the larger, especially if at least one of them is negative, imagine the numbers on a number line with negatives to the left and positives to the right. **The number to the right is always the larger of the two:**

Eg. Which is larger, -4 or -2 ?



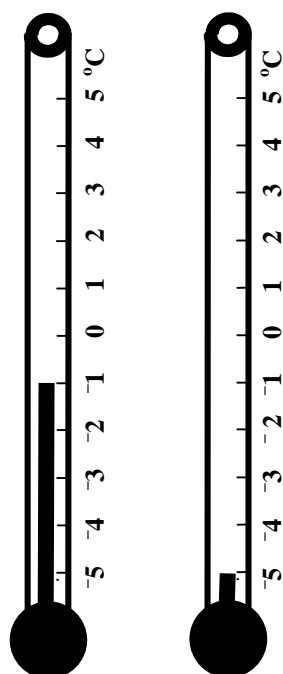
If this is still not clear, imagine the number line on its side with negative numbers below and positive numbers above as in a thermometer. The further up the thermometer a number is, the higher is the number, whether it is positive or negative. After all, a temperature of -3 is warmer than a temperature of -12 !

1. What temperature does this thermometer show?

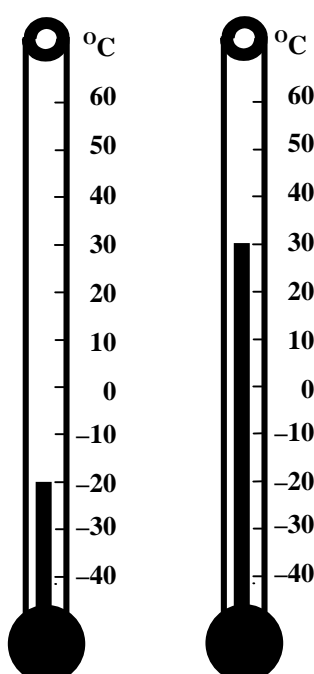


2. What is the difference between -4 and -1 ?

3. What is the difference between these two temperatures?



4. What is the difference between these two temperatures?



5. A woman has -10 dollars in the bank. She takes out another 20 dollars.

How much does she have in the bank now?

6. A diver is under water at -22m . She sinks another 8m .

Where is she now?

7. The temperature is 13°C .

What is the new temperature if it falls by 27°C ?



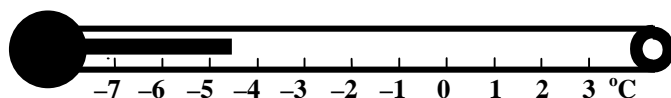
8. A diver is under the water at -15m .

How much must he rise to be at -3m ?

9. The tide is 4m above the average level. It goes down 7m .

Where is it now?

1. What temperature does this thermometer show?

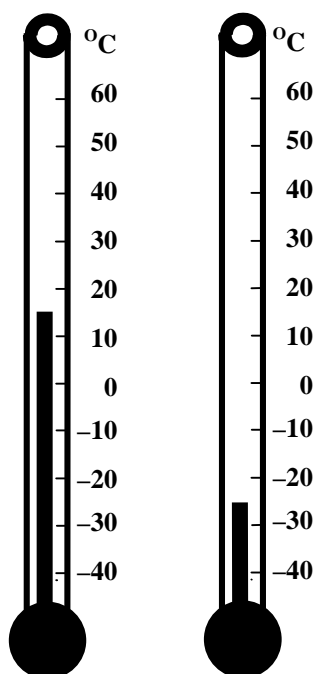


2. What is the difference between -7 and 5 ?

3. What is the difference between these two temperatures?



4. What is the difference between these two temperatures?



5. A woman loses **30 francs**. She then loses another **15 francs**. (It's not her day!) How much is she short now?

6. A submarine is under water at -76m . It rises **15m**.

Where is it now?

7. The temperature is -12°C .

What is the new temperature if it falls by **17°C** ?

Not so bad, after all!

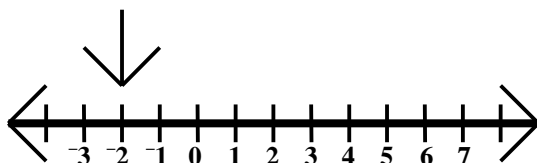


8. A diver is under the water at -5m . How much must he rise to be on a boat **4m** above the water?

9. The tide is **3.6m** above the average level. It goes down **5.2m**.

Where is it now?

1. What number is the arrow pointing to:



2. Put these numbers in order, smallest first:

-3 , -7 , -2 , 0 , -5

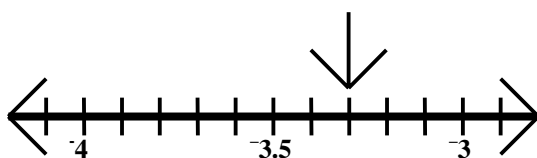
3. Write a whole number between -4 and -7 .

4. Which number is above zero?

-6 , 5 , 0 , -3 , -2

5. What number is 2 below -6 ?

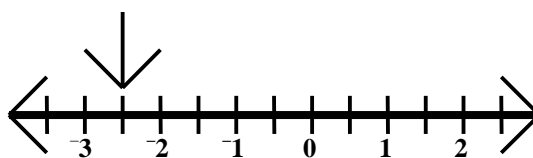
6. What number is the arrow pointing to:



7. What number is 6 above -1 ?

8. If $t < -5$ and $t > -8$, what whole numbers could t be?

9. What number is the arrow pointing to:



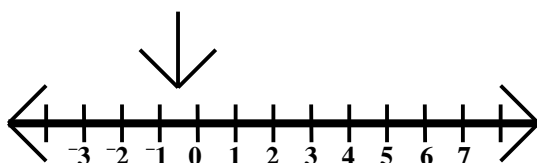
10. Put these numbers in order, largest first:

-6 , 3 , -8 , 0 , -4

This is getting easy!



1. What number is the arrow pointing to:



2. Put these numbers in order, smallest first:

-8.8 , 0 , -4.3 , 7 , -1.2

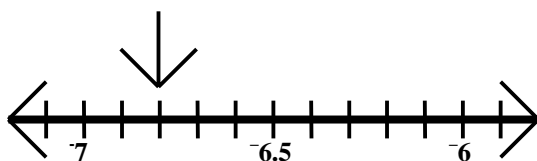
3. Write a decimal number between -5 and -6 .

4. Which number is above zero?

-9 , -4 , 10 , -3.1

5. What number is 2.5 below -9 ?

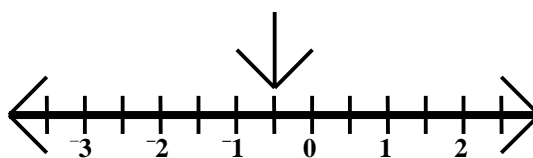
6. What number is the arrow pointing to:



7. What number is 9 above -7.5 ?

8. If $d < -1$ and $d > -4$, what whole numbers could d be?

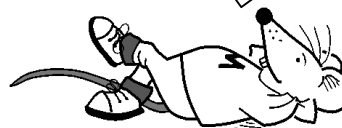
9. What number is the arrow pointing to:



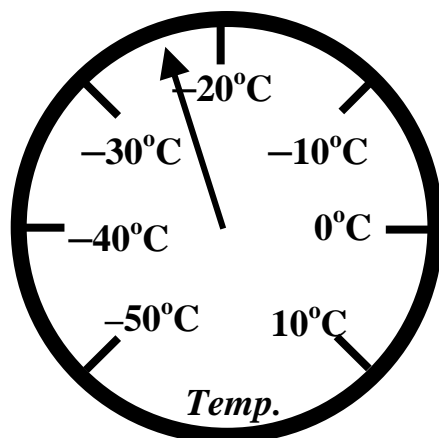
10. Put these numbers in order, largest first:

9 , -7.5 , -8.5 , 10 , -7

Must be time for a break.



1. Estimate the temperature on this freezer thermometer.



2. Due to a breakdown the temperature in the freezer in **question 1** begins to rise. It goes up 15°C in 24 hours.

What will the temperature be then?



3.

 and  are two

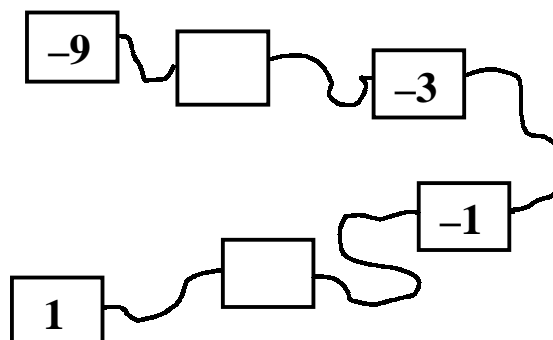
whole numbers, positive or negative.

$$\triangle + \square = 4$$

In the table list numbers that make this statement true.

| | | |
|----|---|---|
| |  |  |
| Eg | -3 | 7 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

4. Here is a string of six cards. Write whole numbers on the blank cards so that the numbers are in the correct order.



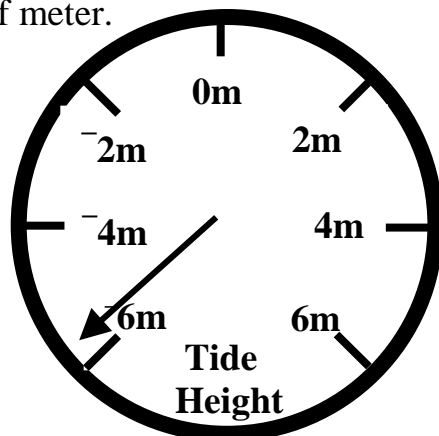
5. If two numbers added together come to zero, what can you say about each pair of numbers?

Try a few examples to investigate this.

You may like to start by finding a number that makes this true:



$$-4 + \square = 0$$

1. Estimate the height of the tide on this meter to the nearest half meter.



2. The meter in **question 1** shows the height of the tide **compared with the average height** (0 is average).



A boy flies a kite **16m** above the average height of the tide. How high is the kite above the water level shown on the meter?

3.  and  are two whole numbers, positive or negative.

$$\bigcirc - 6 = \star$$

In the table list numbers that make this statement true.

Continue the pattern.

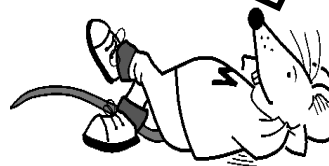
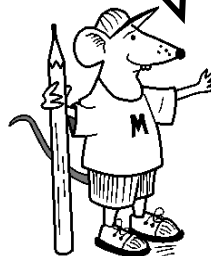
|  |  |
|---|---|
| 9 | 3 |
| 8 | 2 |
| 7 | 1 |
| | |
| | |
| | |
| | |

4. Write the next three numbers in this sequence:

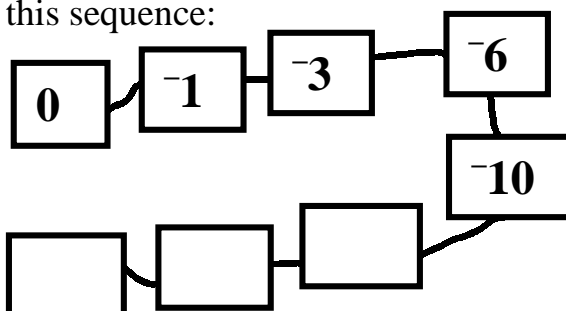
-6, -8, -10, _____

Is a bag empty if it has -6 marbles in it?

Don't ask me, I'm trying to sleep!

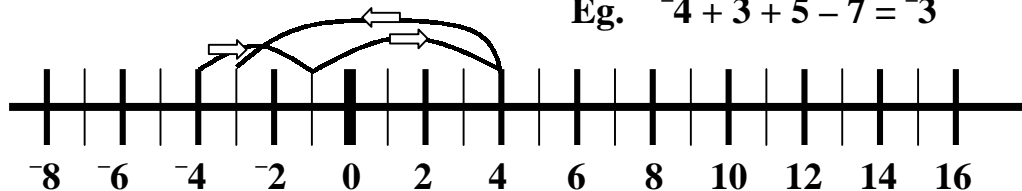


5. Write the next **three** numbers in this sequence:

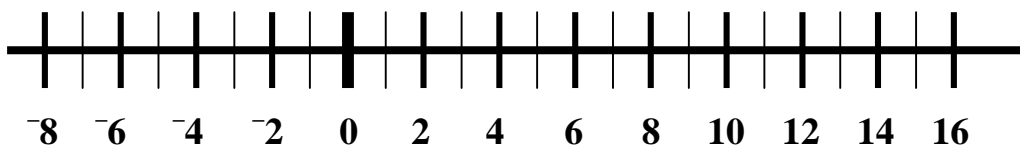


For each question begin on the number line at the first number and then move left for subtraction and right for addition.

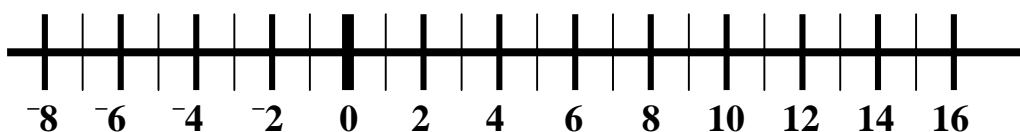
Eg. $-4 + 3 + 5 - 7 = -3$



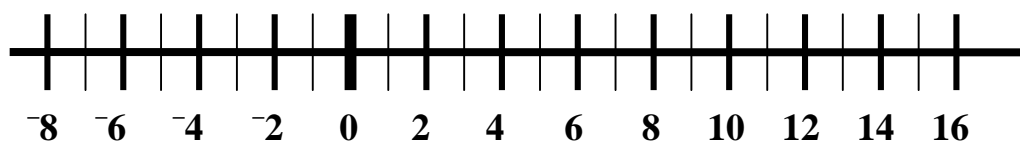
1. $-2 + 6 + 3 - 5 =$



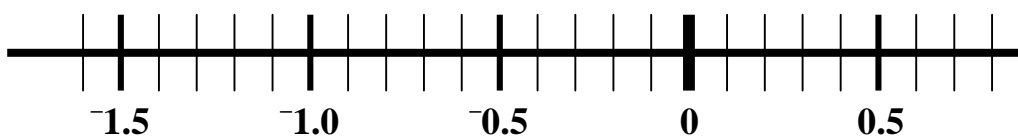
2. $14 + 1 - 9 - 4 + 2 - 8 =$



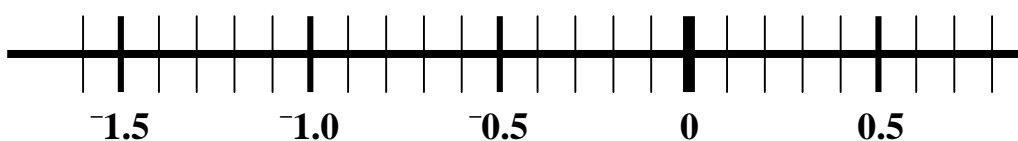
3. $0 + 4 - 7 - 3 + 9 - 4 + 8 =$



4. $0.3 - 1 - 0.7 + 0.5 =$

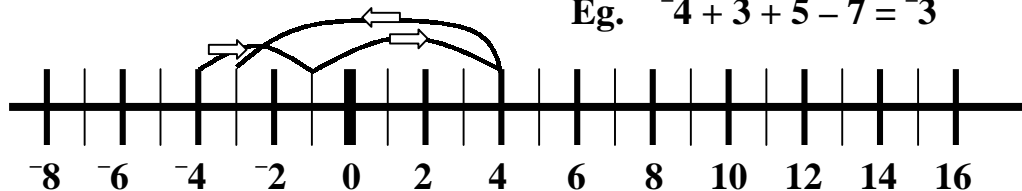


5. $-1.2 + 0.8 + 0.3 + 0.4 - 0.7 =$

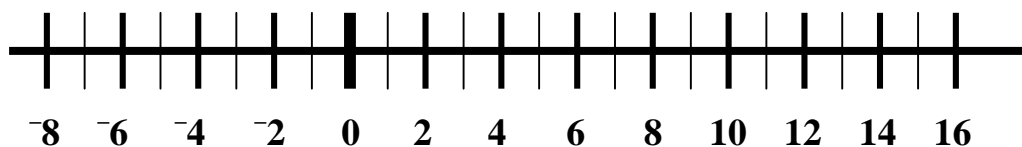


For each question begin on the number line at the first number and then move left for subtraction and right for addition.

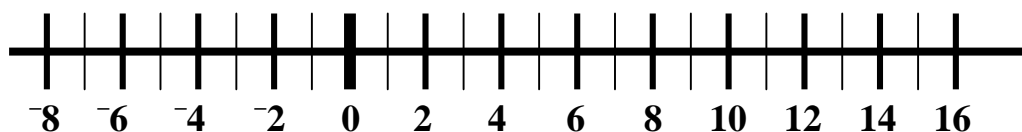
Eg. $-4 + 3 + 5 - 7 = -3$



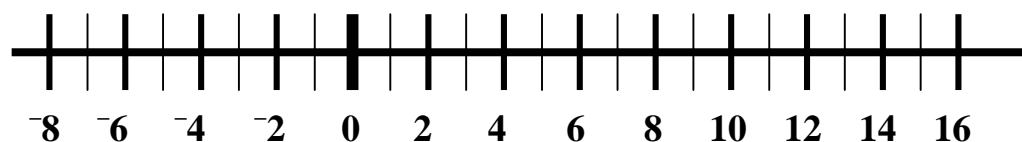
1. $-1 + 8 + 5 - 15 =$



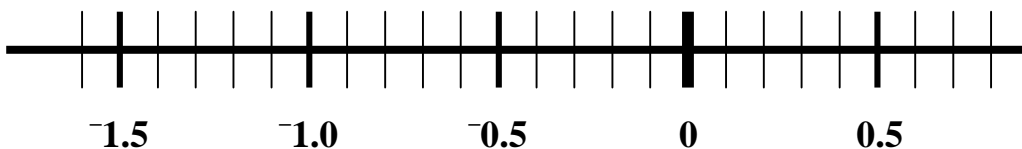
2. $4 - 6 + 10 + 3 - 9 - 7 =$



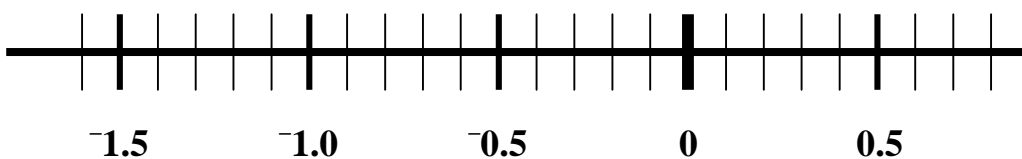
3. $-2 + 12 - 7 + 1 - 8 - 1 + 12 =$



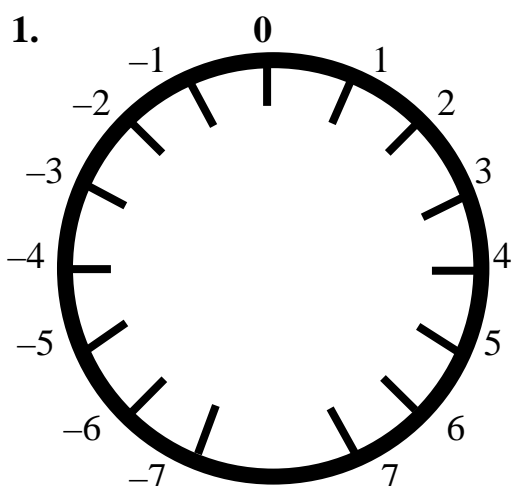
4. $-1.3 + 1 + 0.9 - 0.4 =$



5. $-1.6 + 0.9 + 0.9 + 0.6 - 1.9 =$



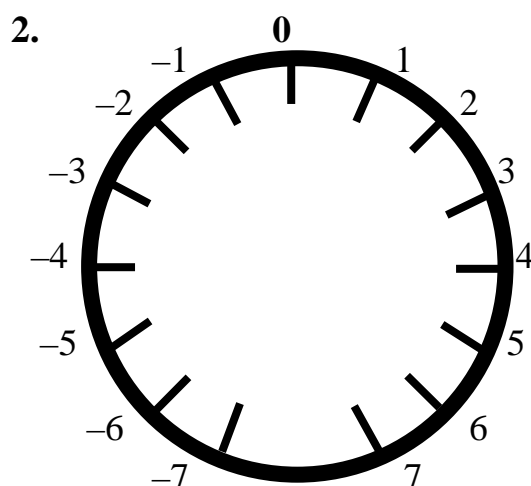
On these diagrams move clockwise for addition and anti-clockwise for subtraction. Start at the first number.



Find a. $1 - 5 + 9 =$

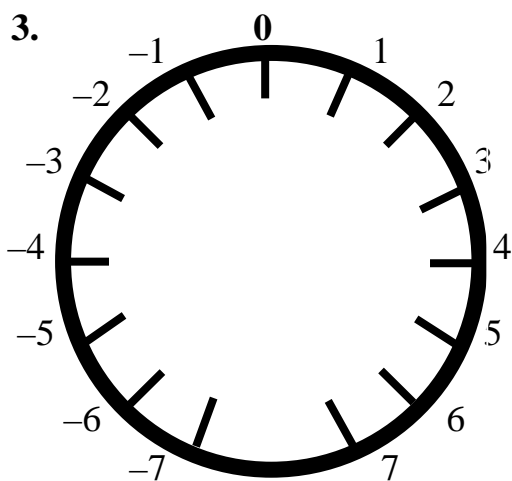
↑
Start here.

b. $4 - 5 - 2 =$



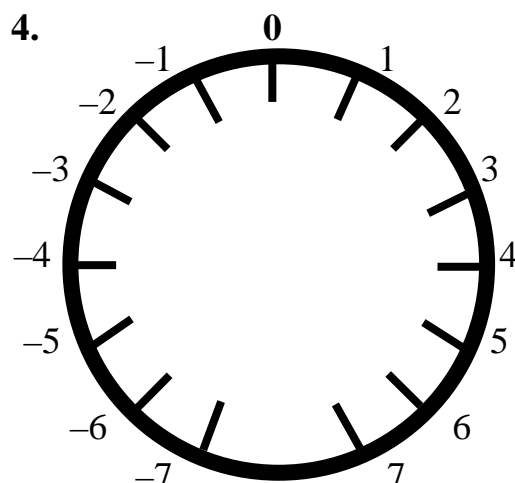
a. $-7 + 5 + 8 - 6 =$

b. $1 + 5 - 7 - 4 =$



a. $5 + 2 - 9 - 4 + 7 =$

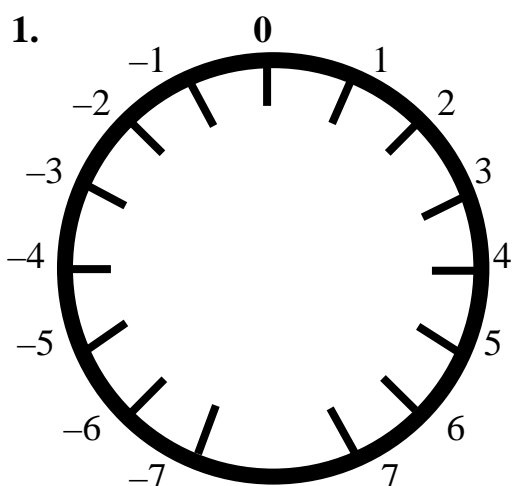
b. $-4 - 3 + 9 + 2 - 6 =$



a. $0 - 4 + 9 - 6 - 2 =$

b. $-3 - 2 + 8 - 4 =$

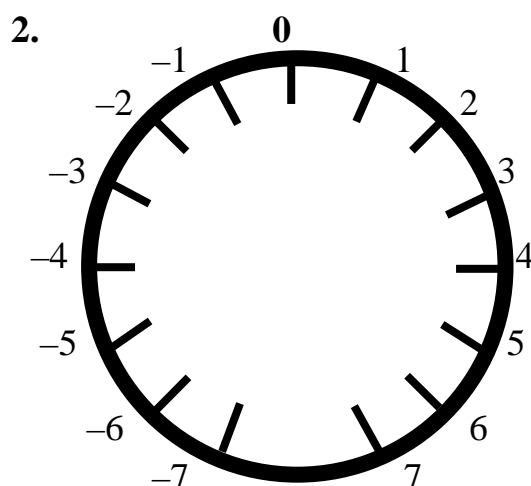
On these diagrams move clockwise for addition and anti-clockwise for subtraction. Start at the first number.



Find a. $6 - 9 - 2 =$

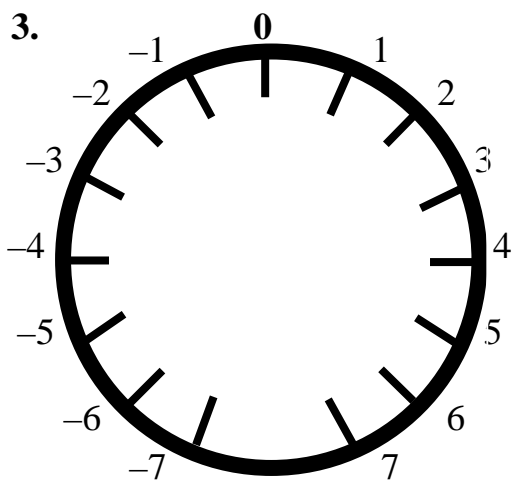
↑
Start here.

b. $7 - 6 - 4 + 2 =$



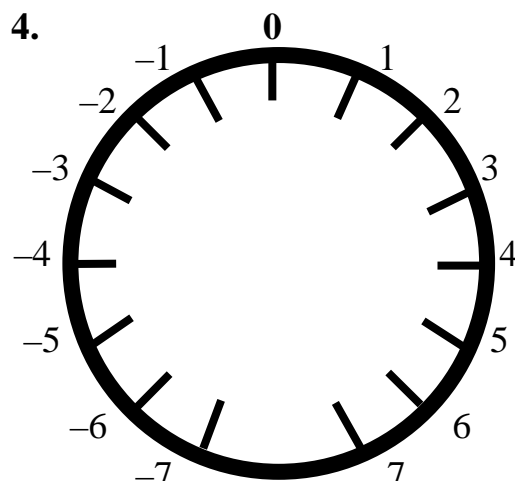
a. $4 - 3 + 5 - 13 =$

b. $3 + 2 - 6 + 8 =$



a. $-6 + 8 - 5 + 3 + 5 =$

b. $7 - 0 - 6 + 1 - 5 - 2 =$



a. $4 - 4 + 5 - 8 - 2 =$

b. $-5 + 6 + 2 - 7 =$

Answers

Page 3.

1. -2°C 2. 3 3. 4°C 4. 50°C 5. 30 dollars 6. 30m
 7. -14°C 8. 12m 9. 3m below average

Page 4

1. -4.5°C 2. 12 3. 5°C 4. 40°C 5. 45 Francs 6. 61m
 7. -29°C 8. 9m 9. 1.6m below average

Page 5

1. -2 2. -7, -5, -3, -2, 0 3. Either -5 or -6
 4. 5 5. -8 6. -3.3 7. 5 8. -6 or -7
 9. -2.5 10. 3, 0, -4, -6, -8

Page 6

1. -0.5 2. -8.8, -4.3, -1.2, 0, 7 3. Anything beginning with -5.
 Eg -5.3 or -5.284 4. 10 5. -11.5 6. -6.8 7. 1.5
 8. -2 or -3 9. -0.5 10. 10, 9, -7, -7.5, -8.5

Page 7

1. -24°C (Accept -23 or -24°C) 2. -9°C (Accept -8 or -9°C)
 3. Any numbers that total 4 such as -4 and 8, but encourage children to write then out sequentially.
 4. First number must be one of: -8, -7, -6, -5 or -4. Second number must be 0.
 5. Conclusion should be along the lines of: Each pair has a negative and positive value of the same number eg -4 and 4.

Page 8

1. -6m 2. 21.5m to 22m 3. Pairs continue as (6, 0) (5, -1) (4, -2) (3, -3)
 4. -12, -14, -16
 5. -15, -21, -28 (Who says you cannot have negative triangle numbers!)

Page 9

1. 2 2. -4 3. 7 4. -0.9 5. -0.4

Page 10

1. -3 2. -5 3. 7 4. 0.2 5. -1.1

Page 11

- 1a. 5 1b. -3 2a. 0 2b. -5 3a. 1 3b. -2 4a. -3 4b. -1

Page 12

- 1a. -5 1b. -1 2a. -7 2b. 7 3a. 5 3b. -5 4a. -5 4b. -4