

Year 8 – Maths Knowledge Organiser #1

Autumn 2021

Place Value



Name:

Class:

| Topic/Skill | Definition/Tips | Example |
|---------------------------|--|---|
| Place value | The value of a digit relating to its position. | |
| Decimal system | Number system based on the number 10. This means only 10 digits are needed. | |
| Digit | A numeral which forms part of a number (or is the number). | |
| Billion | A number a thousand times bigger than a million (nine zeros) | |
| Integer | Any whole number (including zero). | -2, -1, 0, 1, 2, 3, ... |
| Approximate | Calculate a rough answer with rounded numbers. | $2.3 \times 18.4 \approx 2 \times 20 = 40$ |
| Round | Express to a required level of accuracy. | 987 to the nearest thousand is 1000 |
| Equals signs | A way of representing how values relate to each other. | = Equal to \approx Approximately equal to \neq Not equal to \equiv Identity (always equal) |
| Inequality | Similar to an equation , but the unknown has a range of values, not just a single value. | $>$ Greater than \geq Greater than/equal to $<$ Less than \leq Less than or equal to |
| Difference | The value between two numbers (often calculated by subtraction). | Difference between 13 and 29 is 16 because $29-13=16$ |
| Range | A measure of the spread of the data, (<i>largest value – smallest value</i>). | Range: 14 , 16, 16, 17, 19 $\rightarrow 19 - 14 = 5$ |
| Average | The central or typical value in a data set | Mode, median, mean |
| Median | The middle value when the data is in order. | Median: 9, 5, 15, 6, 8 \rightarrow 5, 6, 8 , 9, 15 = 8 |
| Significant figure | Total number of digits in a number, not counting zeros at the beginning or the end of a number. | 345 000 has 3 significant figures 0.3047 has 4 significant figures |

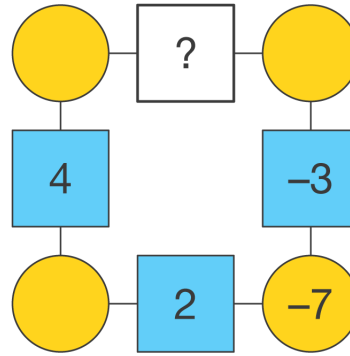
| 1. What is an integer? | a number less than zero a whole number a number between zero and one a number greater than zero | | | | | | | | | | | | |
|--|--|------|------------------|--------|-----|---------|----|--------|---|--------|----|---------------|----|
| 2. Which two integers are negative numbers? | -0.47 6 -17 0 -¼ -289 | | | | | | | | | | | | |
| 3. True or false? 1 is less than -9. | true false | | | | | | | | | | | | |
| 4. Which integer has a greater value? | -6 14 | | | | | | | | | | | | |
| 5. Which integer has a greater value? | -13 -18 | | | | | | | | | | | | |
| 6. Which number has a greater value? | -1 1 | | | | | | | | | | | | |
| 7. True or false? 0 is greater than -8. | true false | | | | | | | | | | | | |
| 8. Select the symbol that makes the following statement true: -501 ___ -502 | > < | | | | | | | | | | | | |
| 9. Select the expression that shows that n is greater than or equal to 4. | $n > 4$ $n = 4$ $n < 4$ $n \geq 4$ $n \leq 4$ $n \neq 4$ | | | | | | | | | | | | |
| 10. Arrange the cities in descending order according to their average temperature (highest first). | Average daytime temperature in January <table border="1"> <thead> <tr> <th>city</th> <th>temperature (°C)</th> </tr> </thead> <tbody> <tr> <td>Ottawa</td> <td>-10</td> </tr> <tr> <td>Beijing</td> <td>-3</td> </tr> <tr> <td>London</td> <td>4</td> </tr> <tr> <td>Moscow</td> <td>-7</td> </tr> <tr> <td>San Francisco</td> <td>11</td> </tr> </tbody> </table> | city | temperature (°C) | Ottawa | -10 | Beijing | -3 | London | 4 | Moscow | -7 | San Francisco | 11 |
| city | temperature (°C) | | | | | | | | | | | | |
| Ottawa | -10 | | | | | | | | | | | | |
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| San Francisco | 11 | | | | | | | | | | | | |
| 11. Which symbol makes the following statement true? 14 ___ 16 | = > ≠ ≥ | | | | | | | | | | | | |

| <p>12. Arrange the cities in descending order according to their height above sea level (highest first).</p> | <p>Height of cities above sea level</p> <table border="1"> <thead> <tr> <th>city</th> <th>height above/below sea level (m)</th> </tr> </thead> <tbody> <tr> <td>Jericho</td> <td>-258</td> </tr> <tr> <td>Azerbaijan</td> <td>-28</td> </tr> <tr> <td>London</td> <td>14</td> </tr> <tr> <td>Edinburgh</td> <td>47</td> </tr> <tr> <td>Amsterdam</td> <td>-2</td> </tr> <tr> <td>Vienna</td> <td>170</td> </tr> </tbody> </table> | city | height above/below sea level (m) | Jericho | -258 | Azerbaijan | -28 | London | 14 | Edinburgh | 47 | Amsterdam | -2 | Vienna | 170 |
|---|--|---------|----------------------------------|---------------|---------|---------------|-------|------------------|--------|----------------|--------|---------------------|--------|--------|-----|
| city | height above/below sea level (m) | | | | | | | | | | | | | | |
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| London | 14 | | | | | | | | | | | | | | |
| Edinburgh | 47 | | | | | | | | | | | | | | |
| Amsterdam | -2 | | | | | | | | | | | | | | |
| Vienna | 170 | | | | | | | | | | | | | | |
| <p>13. Which two integers could satisfy the following expression?</p> $-6 < \underline{\quad} \leq -3$ | <p>-8 5 -6 -3 2 -5</p> | | | | | | | | | | | | | | |
| <p>14. If integer d is less than -5, which three statements are correct?</p> | <p>$d \geq -5$ $d \leq -4$ $d < 5$ $d \leq -6$</p> | | | | | | | | | | | | | | |
| <p>15. Which symbol makes the following statement true?</p> $-12,354 \underline{\quad} -12,345$ | <p>< > =</p> | | | | | | | | | | | | | | |
| <p>16. Arrange the companies in descending order according to their annual profit (greatest first).</p> | <p>Companies in Sumtown annual profits</p> <table border="1"> <thead> <tr> <th>company</th> <th>profit/loss (£)</th> </tr> </thead> <tbody> <tr> <td>Harry's Hotel</td> <td>-31,583</td> </tr> <tr> <td>Tanya's Taxis</td> <td>8,579</td> </tr> <tr> <td>Ahmed's Antiques</td> <td>-9,480</td> </tr> <tr> <td>Gulab's Garage</td> <td>27,084</td> </tr> <tr> <td>Edith's Electricals</td> <td>46,912</td> </tr> </tbody> </table> | company | profit/loss (£) | Harry's Hotel | -31,583 | Tanya's Taxis | 8,579 | Ahmed's Antiques | -9,480 | Gulab's Garage | 27,084 | Edith's Electricals | 46,912 | | |
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| <p>17. Paul and Suzie are thinking of the same integer, x. Paul thinks that x is less than 1. Suzie thinks that x is greater than or equal to -1 but not equal to 0. What integer is x?</p> | | | | | | | | | | | | | | | |
| <p>18. How many integers are greater than -10 and less than 10?</p> | | | | | | | | | | | | | | | |
| <p>19. Ralph says, "The closer a number is to zero, the smaller it is." Is Ralph correct? Explain your answer.</p> | | | | | | | | | | | | | | | |
| <p>20. Jordan is thinking of an integer. His number is greater than -2 but less than or equal to 4. How many different possible integers could Jordan be thinking of?</p> | | | | | | | | | | | | | | | |
| <p>21. Carla is thinking of an odd, one-digit number that is less than -3. If her number is not next to -8 on the number line, what is Carla's number?</p> | | | | | | | | | | | | | | | |

22. The numbers are arranged in descending order. n is a single, positive integer. What is the value of n ?

- n 9 3
- 1 n 5
- 1 n n
- 3 n 9
- n n 1
- n 9 5

23. The number in each square is exactly halfway between the two numbers in the circles on either side of it. What number goes in the highlighted square?

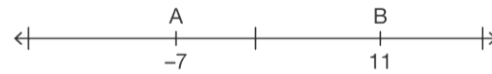


24. What is the largest even negative number you can make using the digit cards?



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25. C is a number that is twice as far from B as it is from A . There are two possible values for C . What are the two possible values?



26. Use the digit cards to complete the grid. You can only use each card once and all the rows, columns and diagonals must add up to 15. What three-digit number goes on the top row?

| | | |
|-----|-----|-----|
| ≠ 3 | | ≠ 2 |
| < 2 | = 5 | |
| < 7 | | |

1 2 3 4 5 6 7 8 9

- 1) a whole number 2) -17 and -289 3) false 4) 14 5) -13 6) 1 7) true 8) > 9) $n \geq 4$
 10) San Francisco, London, Beijing, Moscow, Ottawa 11) ≠
 12) Vienna, Edinburgh, London, Amsterdam, Azerbaijan, Jericho 13) -3 and -5 14) $d \leq -4$, $d > 5$ and $d \leq -6$
 15) > 16) Edith's Electricals, Gulab's Garage, Tanya's Taxis, Ahmed's Antiques, Harry's Hotel 17) -1 18) 19
 19) many answers 20) 6 (-1, 0, 1, 2, 3, 4) 21) -5 22) $n = 4$ 23) -1 24) -13498 25) $c = -25$ and $c = -1$ 26) 834