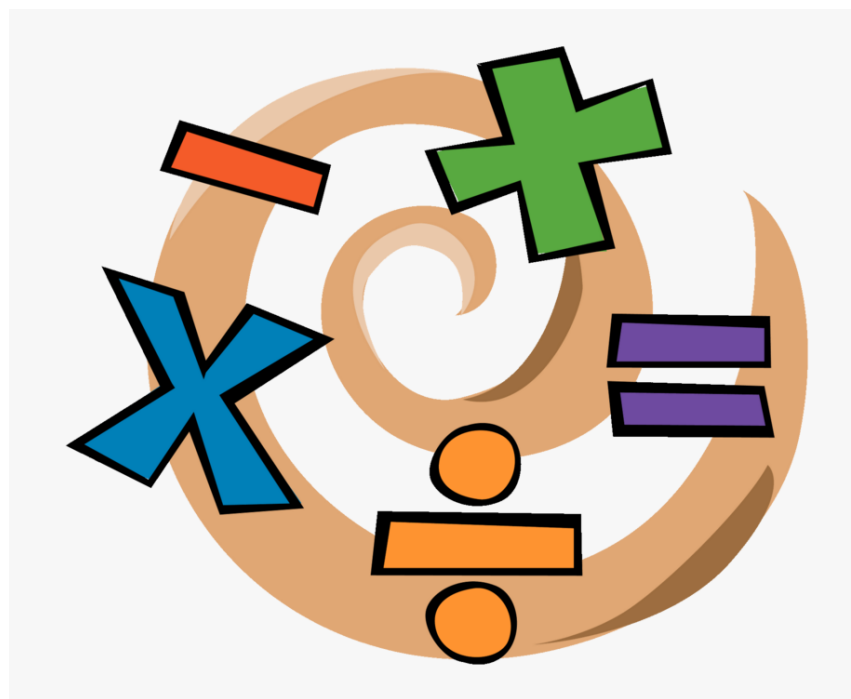


Year 5 Maths





Dear Parents/Carers,

Welcome to this guide to Maths in Year 5. In this booklet you will find knowledge organisers for every Maths topic covered in Year 5 and then some extracts from our calculation policy showing the methods taught. The knowledge organisers include the key vocabulary the children will come across in each topic as well as the key objectives taught and models and images used.

We hope you find these useful and that they will help show you what is being taught in school this year.

Year 5 Team

Place Value

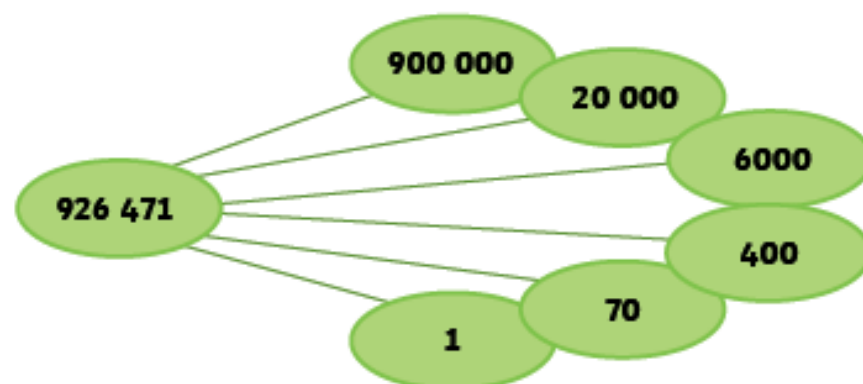
| Number and Place Value | | Knowledge Organiser | | | | | | | | | |
|--|--------------------------------------|---|--|--|-----------|--|-----------|------|------|------|------|
| Key Vocabulary | Compare and Order | | | | | | | | | | |
| millions | equals | greater than | less than | | | | | | | | |
| thousands | $26 + 38 = 8 \times 8$ | $23\ 873 > 8256$ | $901\ 198 < 1\ 091\ 098$ | | | | | | | | |
| hundreds | Both calculations have the value 64. | The number on the left has 2 ten thousands and the number on the right has 0 ten thousands. | The number on the right has 1 million and the number on the left has 0 millions. | | | | | | | | |
| tens | | | | | | | | | | | |
| ones | | | | | | | | | | | |
| zero | | | | | | | | | | | |
| place value | smallest | 898 | 6735 | | | | | | | | |
| greater than | | 6835 | 7019 | | | | | | | | |
| less than | | 9002 | 11 235 | | | | | | | | |
| order | | | greatest | | | | | | | | |
| round | | | | | | | | | | | |
| rounded | | | | | | | | | | | |
| negative number | | | | | | | | | | | |
| partition | | | | | | | | | | | |
| digit | | | | | | | | | | | |
| interval | | | | | | | | | | | |
| sequence | | | | | | | | | | | |
| linear sequence | | | | | | | | | | | |
| Negative Numbers | | | | | | | | | | | |
| | | | | | | | | | | | |
| Counting in Powers of 10 | | | | | | | | | | | |
| Counting in 10s | | Counting in 100s | | | | | | | | | |
| 365 | 375 | 385 | 395 | 405 | 415 | 2841 | 2941 | 3041 | 3141 | 3241 | 3341 |
| The tens increase until 9 tens becomes one more hundred and 0 tens. | | | | | | The hundreds increase until 9 hundreds becomes one more thousand and 0 hundreds. | | | | | |
| Counting in 10 000s | | Counting in 100 000s | | | | | | | | | |
| 276 109 | 286 109 | 296 109 | 306 109 | 2 972 151 | 3 072 151 | 3 172 151 | 3 272 151 | | | | |
| The ten thousands increase until 9 ten thousands become one more hundred thousand and 0 ten thousands. | | | | The hundred thousands increase until 9 hundred thousands becomes one more million and 0 hundred thousands. | | | | | | | |

Numbers to One Million

926 471

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|-------------------|---------------|-----------|----------|------|------|
| 9 | 2 | 6 | 4 | 7 | 1 |

nine hundred and twenty-six thousand, four hundred and seventy-one



Roman Numerals

| | | | | |
|----------|----------|-----------|-----------|------------|
| | I = 1 | II = 2 | III = 3 | |
| IV = 4 | V = 5 | VI = 6 | VII = 7 | VIII = 8 |
| IX = 9 | X = 10 | XI = 11 | XX = 20 | XXX = 30 |
| XL = 40 | L = 50 | LX = 60 | LXX = 70 | LXXX = 80 |
| XC = 90 | C = 100 | CL = 150 | CC = 200 | CCC = 300 |
| CD = 400 | D = 500 | DC = 600 | DCC = 700 | DCCC = 800 |
| CM = 900 | M = 1000 | MC = 1100 | MD = 1500 | MM = 2000 |



CCXLVIII = 248

DCCLXXXIV = 784

MMXIX = 2019

Rounding

Rounding to the nearest 10



Rounding to the nearest 1000



Rounding to the nearest 100 000



Addition and Subtraction

| Addition and Subtraction | | Knowledge Organiser | |
|--------------------------|--|---------------------|--|
| Key Vocabulary | Addition | Subtraction | |
| Add | Place Value Grid: $3274 + 5601 = 8875$ | | |
| Total | | | |
| Make | | | |
| Plus | | | |
| Sum | | | |
| More | | | |
| Altogether | | | |
| Difference | | | |
| Subtract | | | |
| Less | | | |
| Minus | | | |
| Take away | | | |
| Column addition | | | |
| Column subtraction | | | |
| Estimate | | | |
| Inverse operation | | | |
| Number facts | | | |
| Place value | | | |
| Complex | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Estimate and Approximate

Rounding to Estimate

$$41\ 635 + 7386 = 49\ 021$$

Round to ten:

$$41\ 630 + 7380 = 49\ 010$$

$$41\ 630 + 7390 = 49\ 020$$

$$41\ 640 + 7390 = 49\ 030$$

Rounding is not as accurate when both numbers are rounded up. A better estimate comes from "rounding" one down and one up.

Estimating on a Number Line



The arrow is about $\frac{3}{4}$ of the way across the line so it is 40 000.



Inverse Operations

Use the inverse to check:

53 476

32 732

20 744

To check $53\ 476 - 32\ 732 = 20\ 744$
use $32\ 732 + 20\ 744 = 53\ 476$

Start with a number, subtract 409 and double. I end with 6264. To find the starting number use the inverse: halve, then add 409. Half of 6264 = 3132. $3132 + 409 = 3541$. The starting number was 3541.

Multistep Problems

Using a Bar Model

The sum of two numbers is 25 567.

The difference is 1875.



Subtract 1875 from 25 567 = 23 692.

Halve 23 692 to find smaller number = 11 846.

Add 1875 to find larger number = 13 721.

| | | | |
|--------|-------|-------|------------------------------------|
| £20 | | | £20 is used to buy 2 books costing |
| £3.75 | £8.49 | ? | £3.75 and £8.49. |
| £12.24 | | £7.76 | How much change is given? |

$$£3.75 + £8.49 = £12.24$$

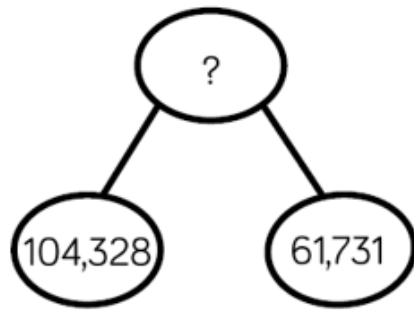
$$£20.00 - £12.24 = £7.76$$

Written Methods and Visuals



Skill: Add numbers with more than 4 digits

Year: 5/6



| | |
|---------|--------|
| 166,059 | |
| 104,328 | 61,731 |

$$104,328 + 61,731 = 166,059$$

| HTh | TTh | Th | H | T | O |
|---------|--|-------------------------------|-----------------------------------|----------|-----------------------|
| 100,000 | | 10,000 10,000 10,000 1,000 | 100 100 100 100 100 100 100 | 10 10 | 1 1 1 1 1 1 1 1 |
| | 10,000 10,000 10,000 10,000 10,000 10,000 | 1,000 | 100 100 100 100 100 100 100 | 10 10 10 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| 1 | 0 | 4 | 3 | 2 | 8 |
| + | 6 | 1 | 7 | 3 | 1 |
| 1 | 6 | 6 | 0 | 5 | 9 |

1





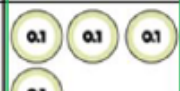

- Place value counters are the most effective concrete resources when adding numbers with more than 4 digits.
- At this stage, children should be encouraged to work in the abstract, using the column method to add larger numbers efficiently.




| | |
|------|------|
| 6.06 | |
| 3.65 | 2.41 |

$$3.65 + 2.41 = 6.06$$

$$\begin{array}{r} 3.65 \\ + 2.41 \\ \hline 6.06 \\ \hline 1 \end{array}$$

| Ones | Tenths | Hundredths |
|--|--|---|
|  |  |  |
|  |  |  |



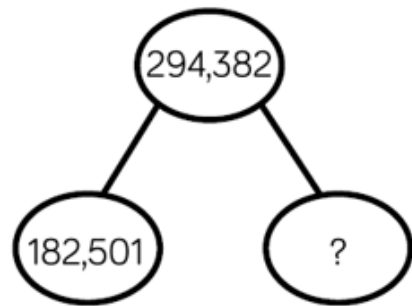
| Ones | Tenths | Hundredths |
|------|--------|------------|
| ●●● | ●●●●●● | ●●●●●● |
| ●● | ●●●●● | ● |
| ● | | |

- Place value counters are the most effective manipulatives when adding decimals with 1, 2 and then 3 decimal places.
- Ensure children have experience of adding decimals with a variety of decimal places. This includes putting this into context when adding money and other measures.



Skill: Subtract numbers with more than 4 digits

Year: 5/6



| 294,382 | |
|---------|---------|
| 182,501 | 111,881 |

$$294,382 - 182,501 = 111,881$$

| HTh | TTh | Th | H | T | O |
|-----|-----|----|---|---|---|
| | | | | | |

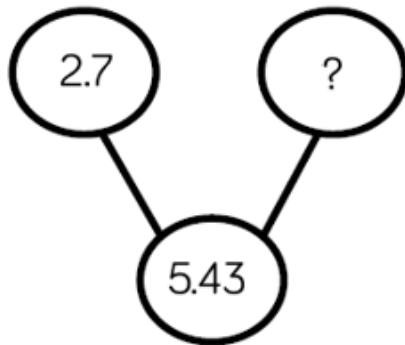
| | | | | | | |
|---|---|---|--------------|----|---|---|
| | 2 | 9 | 3 | 13 | 8 | 2 |
| - | 1 | 8 | 2 | 5 | 0 | 1 |
| | 1 | 1 | 1 | 8 | 8 | 1 |

- Place value counters on a place value grid are the most effective concrete resource when subtracting numbers with more than 4 digits.
- At this stage, children should be encouraged to work in the abstract, using column method to subtract larger numbers efficiently.



Skill: Subtract with up to 3 decimal places

Year: 5/6



| | |
|------|------|
| 5.43 | |
| 2.7 | 2.73 |

$$\begin{array}{r} 4 \quad 1 \\ 5.43 \\ - 2.7 \\ \hline 2.73 \end{array}$$

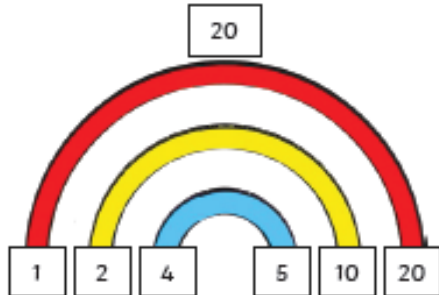


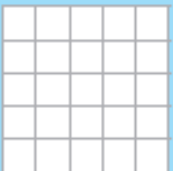
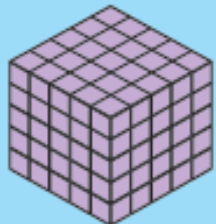

$$5.43 - 2.7 = 2.73$$

| Ones | Tenths | Hundredths |
|------|--------|------------|
| | | |

| Ones | Tenths | Hundredths |
|------|--------|------------|
| | | |

- Place value counters on a place value grid are the most effective manipulative when subtracting decimals with 1, 2 and then 3 decimal places.
- Ensure children have experience of subtracting decimals with a variety of decimal places. This includes putting this into context when subtracting money and other measures.

Multiplication and Division

| Multiplication and Division | | Knowledge Organiser | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| Key Vocabulary | Factors | Prime Numbers | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| multiply | <p>A factor is a number that divides into another number exactly, without leaving a remainder.</p> <div><div>20</div></div> <p>The factors of 20 are 1, 2, 4, 5, 10 and 20.</p> <p>The factor pairs are: 1 and 20 2 and 10 4 and 5</p> <div><div>Factors of 6</div><div>26</div><div>13</div><div>Factors of 15</div><div>515</div></div> <p>A common factor is a factor of 2 or more numbers.</p> | <table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr><tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr><tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr><tr><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td></tr><tr><td>51</td><td>52</td><td>53</td><td>54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td>60</td></tr><tr><td>61</td><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>70</td></tr><tr><td>71</td><td>72</td><td>73</td><td>74</td><td>75</td><td>76</td><td>77</td><td>78</td><td>79</td><td>80</td></tr><tr><td>81</td><td>82</td><td>83</td><td>84</td><td>85</td><td>86</td><td>87</td><td>88</td><td>89</td><td>90</td></tr><tr><td>91</td><td>92</td><td>93</td><td>94</td><td>95</td><td>96</td><td>97</td><td>98</td><td>99</td><td>100</td></tr></table> | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 1 | | | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41 | | | | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51 | | | | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| groups of | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| lots of | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| times | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| divide | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| share | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| remainder | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| factor | Squared ² and Cubed ³ Numbers | Related Calculations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| multiple | <div><div></div><div></div></div> <div><div>$2^2 = 4$ $2 \times 2 = 4$</div><div>$2^3 = 8$ $2 \times 2 \times 2 = 8$</div></div> <div><div></div><div></div></div> <div><div>$5^2 = 25$ $5 \times 5 = 25$</div><div>$5^3 = 125$ $5 \times 5 \times 5 = 125$</div></div> | <div><div>$8 \times 9 = 72$ $80 \times 9 = 720$</div><div>$9 \times 8 = 72$ $90 \times 8 = 720$</div></div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| product | | <div><div>$72 \div 9 = 8$ $720 \div 9 = 80$</div><div>$72 \div 8 = 9$ $720 \div 8 = 90$</div></div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  visit twinkl.com | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Multiplication and Division

Knowledge Organiser

Short Multiplication

$$2543 \times 7 = 17801$$

| | | | | |
|---|---|---|---|---|
| | 2 | 5 | 4 | 3 |
| x | | | | 7 |
| 1 | 7 | 8 | 0 | 1 |
| 1 | 3 | 3 | 2 | |

Remember to move any regrouped digits into the next column. After the next multiplication, add the regrouped number to the answer.

Long Multiplication

$$2543 \times 67 = 170381$$

| | | | | | |
|---|---|---|---|---|---|
| | | 2 | 5 | 4 | 3 |
| | x | | | 6 | 7 |
| | 1 | 7 | 8 | 0 | 1 |
| 1 | 5 | 2 | 5 | 8 | 0 |
| 1 | 3 | 2 | 1 | | |
| 1 | 7 | 0 | 3 | 8 | 1 |
| 1 | 1 | | | | |

Before multiplying by the number in the tens column, remember to use zero as a placeholder because the 6 in 67 is 6 tens (60).

Division

$$136 \div 4 = 34$$

| | | | | |
|---|---|---|---|----------|
| | | 3 | 4 | |
| 4 | 1 | 3 | 6 | |
| - | 1 | 2 | 0 | → 30 × 4 |
| | | 1 | 6 | |
| | - | 1 | 6 | → 4 × 4 |
| | | | 0 | |

→ 30 × 4

→ 4 × 4



Short Division

| | | | |
|---|---|---|---|
| | | 3 | 8 |
| 4 | 1 | 5 | 2 |

15 ÷ 4 = 3 remainder 3

Remember to regroup any remainders and move them into the next column.

| | | | | | | |
|---|--|---|---|---|---|---|
| | | 4 | 5 | 5 | r | 3 |
| 5 | | 2 | 2 | 7 | 8 | |

28 ÷ 5 = 5 remainder 3

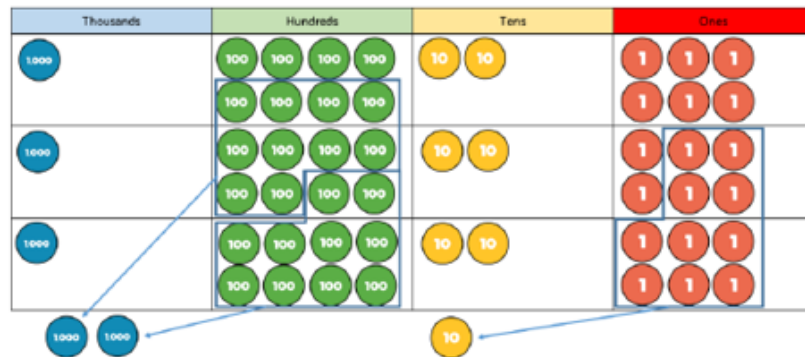
If your calculation has a remainder, remember to record it in the answer using the letter r.

Written Methods and Visuals



Skill: Multiply 4-digit numbers by 1-digit numbers

Year: 5



$$1,826 \times 3 = 5,478$$

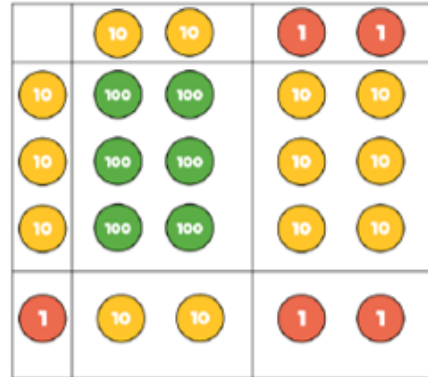
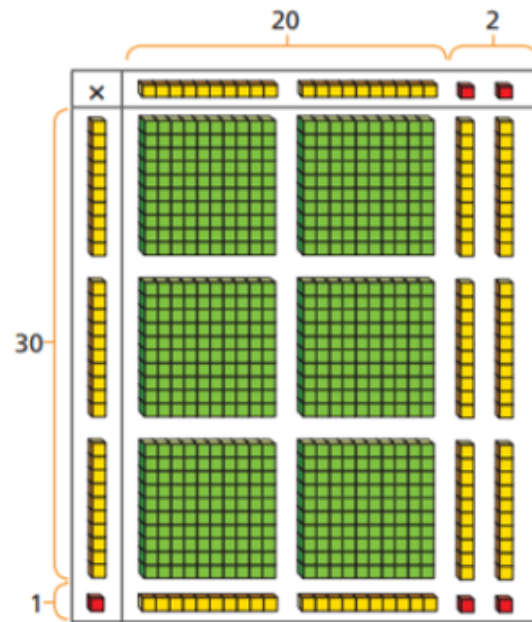
| | Th | H | T | O |
|---|----|---|---|---|
| | 1 | 8 | 2 | 6 |
| x | | | | 3 |
| | 5 | 4 | 7 | 8 |
| | 2 | | 1 | |

- When multiplying 4-digit numbers, place value counters are the best manipulative to use to support children in their understanding of the formal written method. If children are multiplying larger numbers and struggling with their times tables, encourage the use of multiplication grids so the children can focus on the use of the written method.



Skill: Multiply 2-digit numbers by 2-digit numbers

Year: 5



| | | |
|----|-----|----|
| × | 20 | 2 |
| 30 | 600 | 60 |
| 1 | 20 | 2 |

| | | | |
|---|---|---|---|
| | H | T | O |
| | | 2 | 2 |
| × | | 3 | 1 |
| | | 2 | 2 |
| | 6 | 6 | 0 |
| | 6 | 8 | 2 |

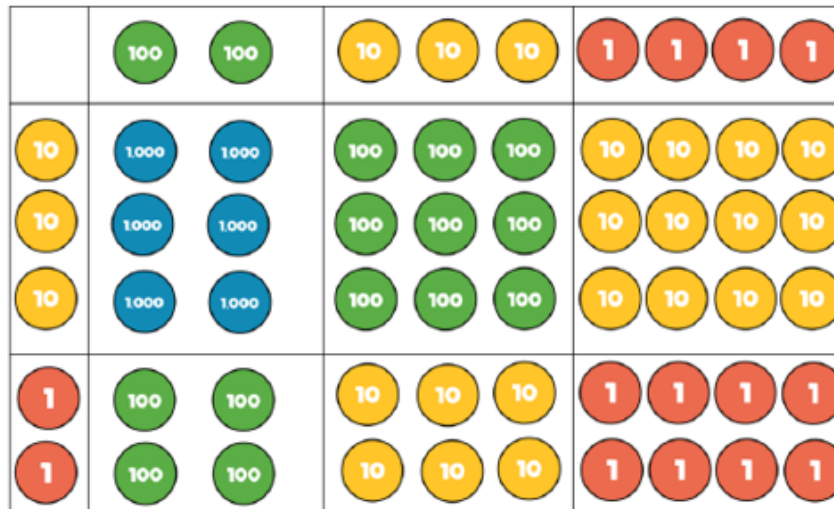
$$22 \times 31 = 682$$

- When multiplying a multi-digit number by 2-digits, use the area model to help children understand the size of the numbers they are using. This links to finding the area of a rectangle by finding the space covered by the base 10. The grid method matches the area model as an initial written method before moving on to the formal written multiplication method.



Skill: Multiply 3-digit numbers by 2-digit numbers

Year: 5/6



| Th | H | T | O |
|-----|-----|---|---|
| | 2 | 3 | 4 |
| x | | 3 | 2 |
| | 4 | 6 | 8 |
| 1 7 | 1 0 | 2 | 0 |
| 7 | 4 | 8 | 8 |

$$234 \times 32 = 7,488$$

| x | 200 | 30 | 4 |
|----|-------|-----|-----|
| 30 | 6,000 | 900 | 120 |
| 2 | 400 | 60 | 8 |

- Children can continue to use the area model when multiplying 3-digit numbers by 2-digits. Place value counters become more efficient to use but Base 10 can be used to highlight the size of the numbers.
- Encourage children to move towards the formal written method, seeing the links with the grid method.



Skill: Multiply 4-digit numbers by 2-digit numbers

Year: 5/6

| TTh | Th | H | T | O |
|--------------|--------------|--------------|--------------|---|
| | 2 | 7 | 3 | 9 |
| × | | | 2 | 8 |
| <hr/> | | | | |
| 2 | 1 | 9 | 1 | 2 |
| ₂ | ₅ | ₃ | ₇ | |
| 5 | 4 | 7 | 8 | 0 |
| ₁ | | ₁ | | |
| <hr/> | | | | |
| 7 | 6 | 6 | 9 | 2 |

1











































$$2,739 \times 28 = 76,692$$

- When multiplying 4-digits by 2-digits, children should be confident in written method.
- If they are still struggling with the times tables, provide multiplication grids to support when they are focusing on the use of the method.
- Consider where exchanged digits are placed and make sure this is consistent.



Skill: Divide 4-digits by 1-digit (grouping)

Year: 5

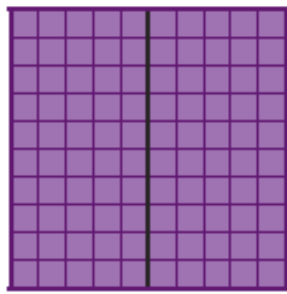
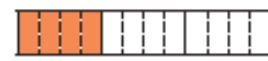










| Th | H | T | O |
|---|---|--|--|
|   |   |   |   |
|   |   |  |   |
|   |  |   |   |
|   | |   |   |
| | |   |   |
| | |   |   |
| | |   |   |
| | |   | |

| | | | | |
|---|---|---|----|----|
| | 4 | 2 | 6 | 6 |
| 2 | 8 | 5 | 13 | 12 |

$$8,532 \div 2 = 4,266$$

- Place value counters or plain counters can be used on a place value grid to support children to divide 4-digits by 1-digit. Children can also draw their own counters and group them through a more pictorial method.
- Children should be encouraged to move away from the concrete and pictorial when dividing numbers with multiple exchanges.

Fractions

| Fractions | | Knowledge Organiser | | |
|--------------------|---|---|--|----------------------------------|
| Key Vocabulary | Equivalent Fractions | Compare and Order Fractions | | |
| numerator | <p>To find equivalent fractions, we multiply or divide the numerator and denominator by the same number.</p> <div><div><div><div><div><div>×5</div><div>×10</div></div><div><div>1/2</div><div>=</div><div>5/10</div><div>=</div><div>50/100</div></div><div><div>×5</div><div>×10</div></div></div></div></div></div> <div><p>We can compare and order fractions by using common denominators.</p><div><div><div><div><div>1/3, 5/6, 7/12</div><div></div></div><div><div>4/12, 10/12, 7/12</div><div></div></div><div><div>1/3, 7/12, 5/6</div><div></div></div></div><div><div><div>11/8 > 5/4 > 10/8</div><div><div>×2</div><div>×2</div></div><div><div></div><div><div></div></div></div></div></div></div></div></div> | | | |
| denominator | | | | |
| unit fraction | | | | |
| non-unit fraction | | | | |
| whole | | | | |
| equivalent | Mixed Numbers | Improper Fractions | | |
| mixed number | <p>Mixed numbers contain a whole number and a fraction.</p> <div><div>whole</div><div>→ 2 1/4 ←</div><div>fraction</div></div> | <p>An improper fraction has a numerator which is greater than or equal to the denominator.</p> <div><div>5</div><div>3</div></div> | | |
| improper fraction | Convert an Improper Fraction to a Mixed Number | Convert a Mixed Number to an Improper Fraction | | |
| simplest form | <div><div>9</div><div>4</div><div>9 ÷ 4 = 2r1</div><div>2 1/4</div><div>Divide the numerator by the denominator.</div><div>This shows you the whole number and the fraction.</div></div> | <div><div>Multiply the whole by the denominator to make an improper fraction.</div><div>2 5/6 = 12/6 + 5/6 = 17/6</div><div>Add the fractions together.</div></div> | | |
| multiple | <th>Adding and Subtracting Fractions</th> | | | Adding and Subtracting Fractions |
| common denominator | <p>To add or subtract fractions with denominators that are multiples of the same number, we must change one fraction to have the same denominator.</p> | | | |
| common numerator | <div><div><div><div>1/3 + 1/3 = 2/3</div><div></div></div><div><div>4/5 - 3/5 = 1/5</div><div></div></div><div><div>1/4 + 3/8 = 2/8 + 3/8 = 5/8</div><div></div></div><div><div>5/6 - 2/3 = 5/6 - 4/6 = 1/6</div><div></div></div></div></div> | | | |

Fractions

Knowledge Organiser

Add Fractions Where the Total is Greater Than 1

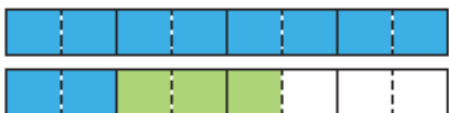
$$\frac{1}{2} + \frac{3}{4} + \frac{5}{8} - \frac{4}{8} + \frac{6}{8} + \frac{5}{8} - \frac{15}{8} = 1\frac{7}{8}$$



Add Mixed Numbers

$$1\frac{1}{4} + \frac{3}{8} - 1\frac{2}{8} + \frac{3}{8} - 1 + \frac{5}{8} - 1\frac{5}{8}$$

$$1\frac{1}{4} + \frac{3}{8} - \frac{5}{4} + \frac{3}{8} - \frac{10}{8} + \frac{3}{8} - \frac{13}{8} = 1\frac{5}{8}$$



Subtract from a Mixed Number

$$1\frac{2}{3} - \frac{2}{9} - 1\frac{6}{9} - \frac{2}{9} = 1\frac{4}{9}$$

| starting number | find the equivalent fraction | subtract |
|-----------------|------------------------------|----------|
| | | |
| | | |

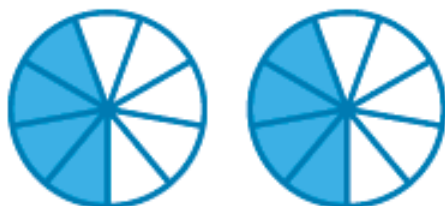
Multiply Unit Fractions by an Integer

$$\frac{1}{3} \times 5 = \frac{5}{3}$$



Multiply Non-Unit Fractions by an Integer

$$2 \times \frac{4}{9} = \frac{8}{9}$$



Subtract Two Mixed Numbers

$$2\frac{3}{4} - 1\frac{5}{8} - 1\frac{1}{8}$$



Multiply Mixed Numbers by Integers

Convert to an improper fraction and multiply the numerator by the integer.

$$2\frac{1}{4} \times 2$$

-

$$\frac{9}{4} \times 2$$

-

$$\frac{18}{4}$$

-

$$4\frac{2}{4}$$

-

$$4\frac{1}{2}$$

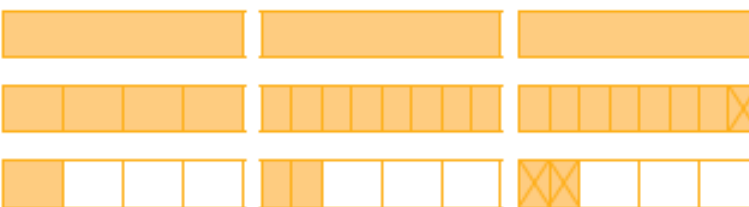


Use repeated addition.

$$2\frac{1}{4} \times 2 = 2\frac{1}{4} + 2\frac{1}{4} = 4\frac{2}{4} = 4\frac{1}{2}$$

Subtract from a Mixed Number - Breaking the Whole

$$2\frac{1}{4} - \frac{3}{8} - 2\frac{2}{8} - \frac{3}{8} = 1\frac{10}{8} - \frac{3}{8} = 1\frac{7}{8}$$



Decimals

Decimals

Key Vocabulary

tenths

hundredths

decimal
tenths

decimal
hundredths

decimal
equivalents

part-whole
model

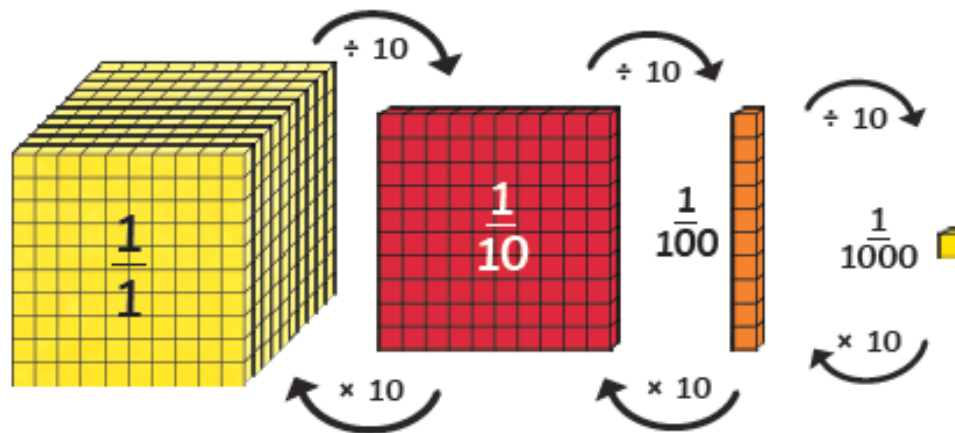
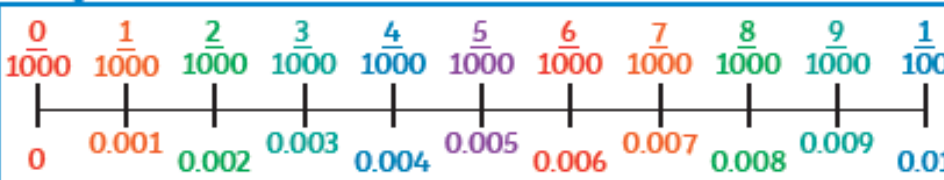
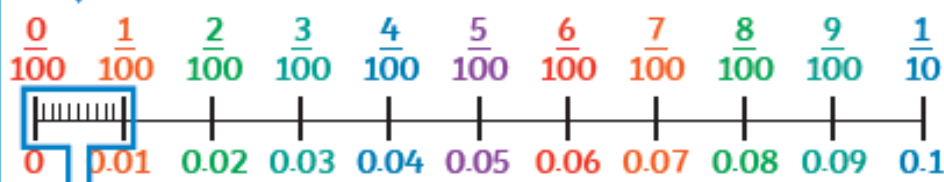
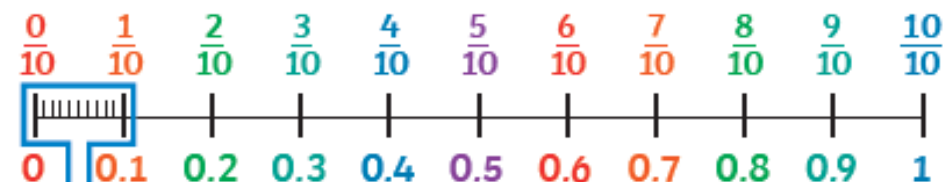
rounding

decimal point

place value

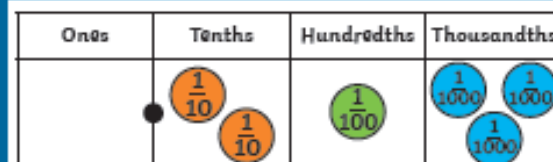


Tenths, Hundredths and Thousandths

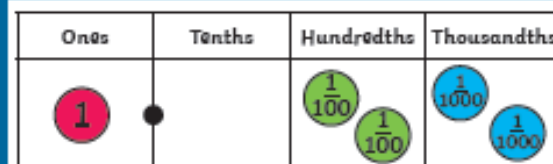


Knowledge Organiser

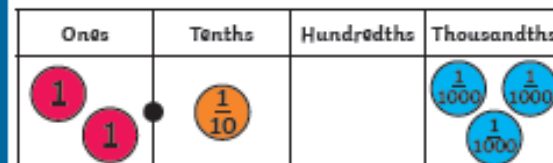
Order and Compare Numbers with Three Decimal Places



0 . 2 1 3



1 . 0 2 2



2 . 1 0 3

Decimal Numbers as Fractions

$$0.71 = \frac{71}{100} = \frac{7}{10} + \frac{1}{100}$$

$$0.37 = \frac{37}{100} = \frac{3}{10} + \frac{7}{100}$$

Decimals

Knowledge Organiser

Multiplying and Dividing by 10, 100 and 1000

| Tens | Ones | Tenths | Hundredths | Thousandths |
|-------------|------|--------|------------|-------------|
| 3 | 8 | | | |
| $\div 10$ | | | | |
| | 3 | 8 | | |
| 3 | 8 | | | |
| $\times 10$ | | | | |
| | 3 | 8 | | |

| Tens | Ones | Tenths | Hundredths | Thousandths |
|--------------|------|--------|------------|-------------|
| 3 | 8 | | | |
| $\div 100$ | | | | |
| | 0 | 3 | 8 | |
| 3 | 8 | | | |
| $\times 100$ | | | | |
| | 0 | 3 | 8 | |

| Tens | Ones | Tenths | Hundredths | Thousandths |
|---------------|------|--------|------------|-------------|
| 3 | 8 | | | |
| $\div 1000$ | | | | |
| | 0 | 0 | 3 | 8 |
| 3 | 8 | | | |
| $\times 1000$ | | | | |
| | 0 | 0 | 3 | 8 |

Adding and Subtracting Decimals

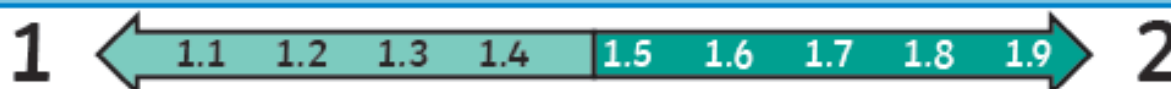
$$0.8 + 0.001 = 0.801$$

$$1.031 - 0.23 = 0.801$$

$$0.4005 + 0.4005 = 0.801$$

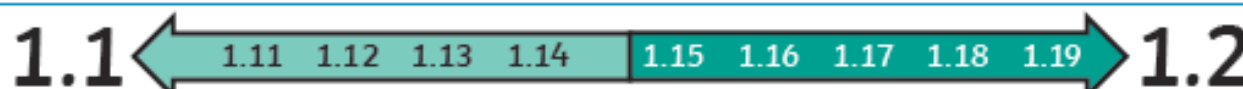


Rounding Decimals



If the tenths digit is 1, 2, 3 or 4, we round down to the nearest whole number.

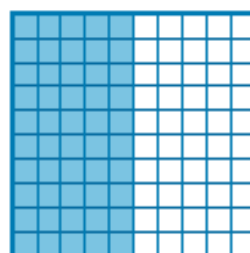
If the tenths digit is 5, 6, 7, 8 or 9, we round up to the nearest whole number.



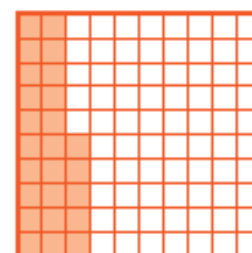
If the hundredths digit is 1, 2, 3 or 4, we round down to the nearest tenth.

If the hundredths digit is 5, 6, 7, 8 or 9, we round up to the nearest tenth.

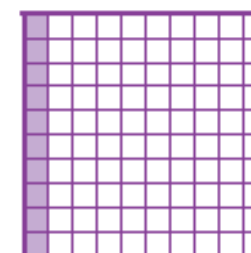
Percentage and Decimal Equivalents



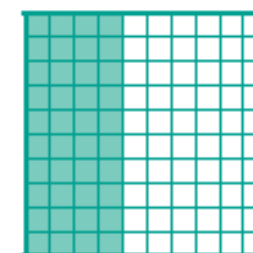
$$50\% = \frac{50}{100} = \frac{1}{2} = 0.5$$



$$25\% = \frac{25}{100} = \frac{1}{4} = 0.25$$



$$10\% = \frac{10}{100} = \frac{1}{10} = 0.1$$

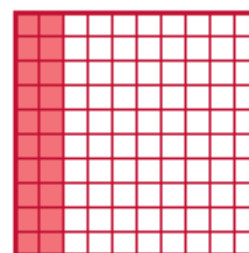


$$40\% = \frac{40}{100} = \frac{2}{5} = 0.4$$

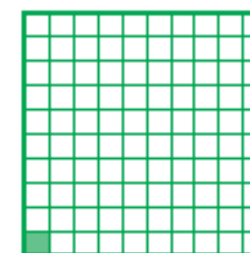
Crossing the Whole

$$0.82 + 0.63 = 1.45$$

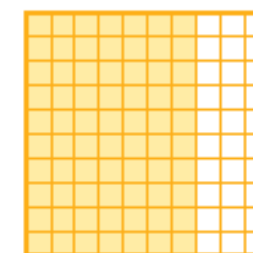
$$2.531 - 0.6 = 1.931$$



$$20\% = \frac{20}{100} = \frac{1}{5} = 0.2$$







$$1\% = \frac{1}{100} = 0.01$$



$$70\% = \frac{70}{100} = \frac{7}{10} = 0.7$$

Converting Units

| Converting Units | | Knowledge Organiser | |
|---|---|--|---|
| Key Vocabulary | Converting Mass | | Converting Capacity |
| mass |  <div>$\times 1000$ $\text{kg} \rightarrow \text{g}$ $\div 1000$</div> | $1000\text{g} = 1\text{kg}$ $\frac{1}{10}\text{kg} = 0.1\text{kg} = 100\text{g}$ $\frac{1}{4}\text{kg} = 0.25\text{kg} = 250\text{g}$ $\frac{1}{2}\text{kg} = 0.5\text{kg} = 500\text{g}$ $\frac{3}{4}\text{kg} = 0.75\text{kg} = 750\text{g}$ |  <div>$\times 1000$ $\text{l} \rightarrow \text{ml}$ $\div 1000$</div> |
| gram | | | |
| kilogram | | | |
| capacity | | | |
| volume | | | |
| Converting Length | | | |
| millilitre |  | <div>$\times 1000$ $\text{km} \rightarrow \text{m}$ $\div 1000$</div> | |
| centilitre | | <div>$\times 100$ $\text{m} \rightarrow \text{cm}$ $\div 100$</div> | |
| litre | | <div>$\times 10$ $\text{cm} \rightarrow \text{mm}$ $\div 10$</div> | |
| millimetre | | $1000\text{ metres} = 1\text{ kilometre}$ | |
| centimetre | | $100\text{cm} = 1\text{m}$ | |
| kilometre | | $10\text{mm} = 1\text{cm}$ | |
|  visit twinkl.com | | $\frac{1}{10}\text{km} = 0.1\text{km} = 100\text{m}$ | |
| | | $\frac{1}{4}\text{km} = 0.25\text{km} = 250\text{m}$ | |
| | | $\frac{1}{2}\text{km} = 0.5\text{km} = 500\text{m}$ | |
| | | $\frac{3}{4}\text{km} = 0.75\text{km} = 750\text{m}$ | |

Units of Time

Minute

1 minute = 60 seconds



Hour

1 hour = 60 minutes



Day

1 day = 24 hours



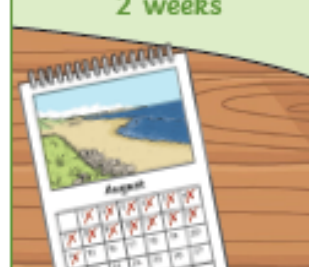
Week

1 week = 7 days



Fortnight

1 fortnight = 2 weeks



Month

January = 31 days
February = 28 days (29 on a leap year)
March = 31 days
April = 30 days
May = 31 days
June = 30 days
July = 31 days
August = 31 days
September = 30 days
October = 31 days
November = 30 days
December = 31 days



Year

1 year =
12 months =
52 weeks =
365 days



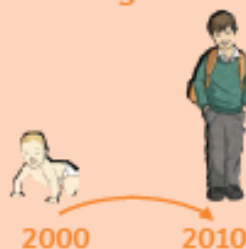
Leap Year

1 leap year =
366 days



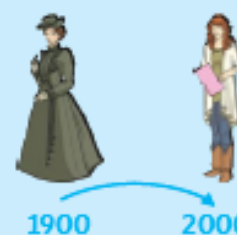
Decade

1 decade =
10 years



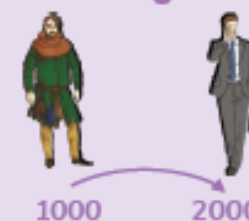
Century

1 century =
100 years


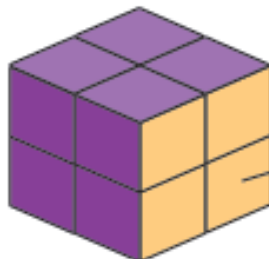

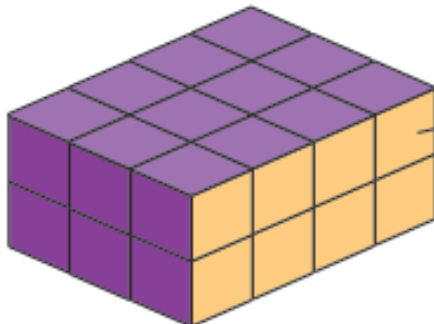




Millennium

1 millennium =
1000 years



Measurement and Volume

| Volume | | Knowledge Organiser | | |
|---|--|---|---|---|
| Key Vocabulary | Volume of Cubes and Cuboids | | | |
| cubed | <p>Volume is measured in cubed units. For example, cm³, m³ and km³.</p> <p>To calculate the volume of cubes and cuboids:</p> <ol style="list-style-type: none">1. Calculate the area of the cross-section (one face).2. Multiply the area of the cross-section (one face) by its depth. | |  | |
| area | | | | |
| cross-section | | | | |
| prism | | | | |
| cube |  | Area of cross section (face) = 2cm × 2cm = 4cm ² | |  |
| cuboid | | 4cm ² × 2cm = Volume of 8cm ³ | | |
| face | | | | |
| length | | | | |
| height |  | Area of cross section (face) = 4cm × 2cm = 8cm ² | |  |
| width | | 8cm ² × 3cm = Volume of 24cm ³ | | |
| depth | | | | |
|  visit twinkl.com | | | | |

Key Vocabulary

cubed

area

cross-section

prism

cube

cuboid

face

length

height

width

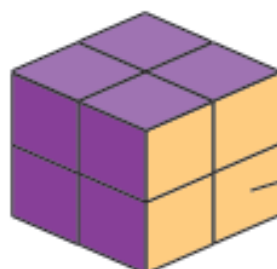
depth

Volume of Cubes and Cuboids

Volume is measured in cubed units. For example, cm^3 , m^3 and km^3 .

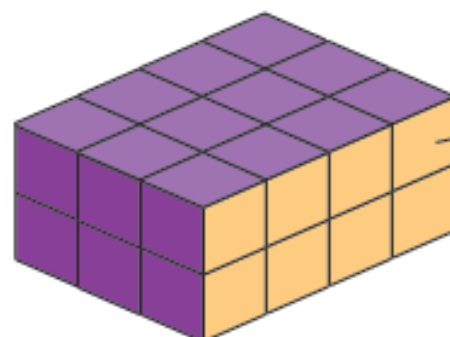
To calculate the volume of cubes and cuboids:

1. Calculate the area of the cross-section (one face).
2. Multiply the area of the cross-section (one face) by its depth.



$$\text{Area of cross section (face)} = 2\text{cm} \times 2\text{cm} = 4\text{cm}^2$$

$$4\text{cm}^2 \times 2\text{cm} = \text{Volume of } 8\text{cm}^3$$


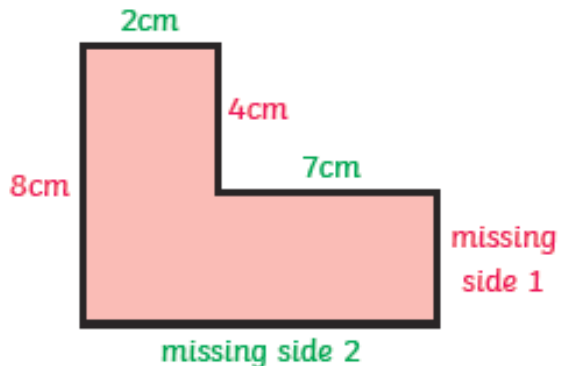





$$\text{Area of cross section (face)} = 4\text{cm} \times 2\text{cm} = 8\text{cm}^2$$

$$8\text{cm}^2 \times 3\text{cm} = \text{Volume of } 24\text{cm}^3$$



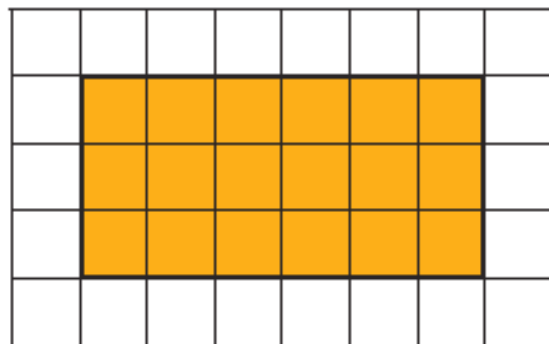
Area and Perimeter

| Perimeter and Area | | Knowledge Organiser |
|---|--|---|
| Key Vocabulary | Measure Perimeter | Calculate Perimeter |
| metre | Measure the perimeter of a rectangle:  | Calculate the missing sides of this rectilinear shape to find the perimeter:  |
| kilometre | | |
| perimeter | Measure the length (l) and width (w). $\text{Perimeter} = l + w + l + w \text{ or } (l + w) \times 2$ | |
| length | Measure the perimeter of regular shapes:  Measure the length (l) and count the number of sides (s) on the shape. $\text{Perimeter} = l \times s$ | |
| width | Measure the perimeter of irregular shapes:  | |
| rectangle | Measure the length of each side and add them together. | * This shape is not drawn to the dimensions specified. $\text{Missing side 1} + 4\text{cm} = 8\text{cm},$ $\text{so missing side 1} = 4\text{cm}.$ $\text{Missing side 2} = 2\text{cm} + 7\text{cm} = 9\text{cm}$ $\text{Perimeter} = \text{sum of all sides} =$ $2\text{cm} + 4\text{cm} + 7\text{cm} + 4\text{cm} + 9\text{cm} + 8\text{cm} = 34\text{cm}$ |
| rectilinear | | |
| dimensions | | |
|  visit twinkl.com | | |

Length and Perimeter

Area of Rectangles

The area of a rectangle on a grid:



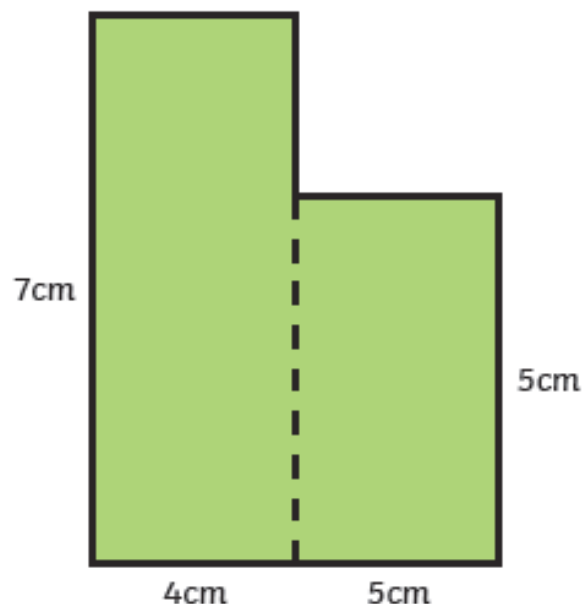
Multiply the length \times width
 $= 6 \times 3 = 18$ squares.

The area of a rectangle = length (l) \times width (w).



Area of Compound Shapes

To find the area of a compound shape, divide the shape into rectangles with known dimensions:

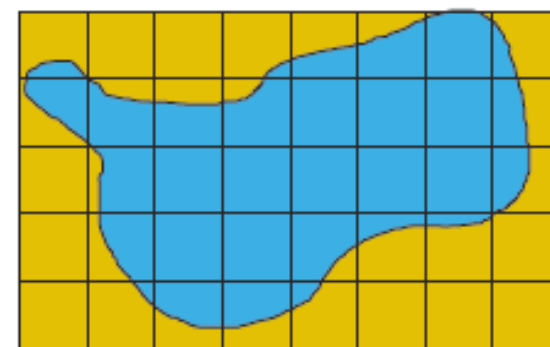


$$\begin{aligned}\text{Area} &= 7\text{cm} \times 4\text{cm} + 5\text{cm} \times 5\text{cm} \\ &= 28\text{cm}^2 + 25\text{cm}^2 \\ &= 53\text{cm}^2\end{aligned}$$

Knowledge Organiser

Area of Irregular Shapes

To find the area of an irregular shape, find the number of whole squares and part squares.



Whole squares = 10
 Part squares = 22

$$\begin{aligned}\text{Estimate of area} &= \text{whole squares} + \text{half part squares} \\ &= 10\text{cm}^2 + 11\text{cm}^2 = 21\text{cm}^2\end{aligned}$$

*There are other ways to estimate the area of irregular shapes.

Statistics

Statistics

Knowledge Organiser

Key Vocabulary

axis

continuous data

horizontal

data

interpret

label

line graph

maximum value

minimum value

pattern

predict

relationship

represent

scale

survey

table

tally

timetable

vertical

x-axis

y-axis

Reading and Understanding Tables

A table to show ticket prices at a local cinema.

| Ticket Type | Weekday Price | Weekend Price |
|-------------|---------------|---------------|
| Adult | £6 | £7.50 |
| Child | £4 | £4.50 |
| Student | £5.50 | £6 |

In order to understand the data presented in a table, you must read the **table's title** and the **headings**. Remember to always look at the heading that **each piece of information** falls under.

Completing Tables

Here is a table showing the favourite drink flavours of some children.

| | Boys | Girls | Total |
|--------------|------|-------|-------|
| Orange | 8 | | 18 |
| Blackcurrant | | 6 | |
| Total | 15 | | |

To find how many boys voted for blackcurrant, look at the total number of boys who voted and subtract the number of votes for orange.

To find how many girls voted for orange, look at the total number of votes for orange and subtract the number of votes from boys.

To find the total number of votes for blackcurrant, the total number of girls or the total number of voters, simply add up the values from the appropriate row or column.

Timetables

Here is a bus timetable:

Three different buses

| | | | | |
|--------------------|---------------|------|------|------|
| Bus stop locations | Mill Road | 0726 | | 0842 |
| | High Street | 0729 | 0803 | |
| | Pitsmoor Road | 0759 | 0833 | |
| | Fulwood | 0845 | 0919 | 0946 |

The bus starts at this time and location.

The bus does not stop here.

The bus terminates at this time and location.

twinkl

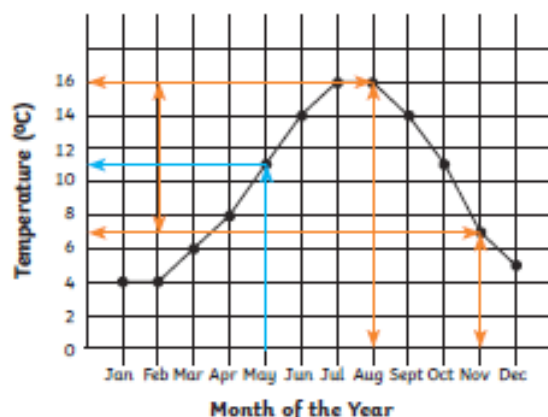
visit twinkl.com

Read and Interpret Line Graphs

Here is a line graph showing the average temperature for each month.

The y-axis shows temperature in intervals of 2°C on a scale of 0°C to 16°C .

The points show the average temperature for each month.



The x-axis shows the months of the year.

Use Line Graphs to Solve Problems

To find the average temperature in May, follow the arrow up from May and across to the temperature. As this is halfway between 10°C and 12°C , the average temperature in May is 11°C .

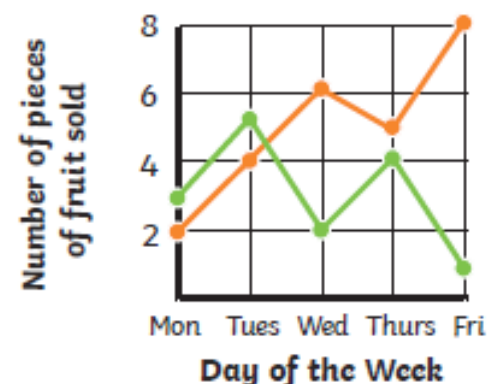
To find the difference between the average temperatures in August and in November, find the temperature for each month and calculate the difference between the two. The shape of the line graph can show how the temperature changed. The average temperature falls 9°C from August to November.

Draw Line Graphs

Here is a table showing the number of different types of fruit sold each day.

| | Bananas | Apples |
|-------|---------|--------|
| Mon | 2 | 3 |
| Tues | 4 | 5 |
| Wed | 6 | 2 |
| Thurs | 5 | 4 |
| Fri | 8 | 1 |

This graph can be used to represent the data from the table.



Mark each point for the number of bananas sold each day and join each point with a line.

Mark each point for the number of apples sold each day and join each point with a line.

Properties of shape

Properties of Shape

Key Vocabulary

angle

right angle

acute

obtuse

reflex

protractor

horizontal

vertical

parallel

perpendicular

polygon

regular

irregular

two-dimensional

three-dimensional

flat face

curved surface



edge

curved edge

vertex

apex

Regular and Irregular Polygons

| Regular | Irregular |
|---|--|
|  |  |

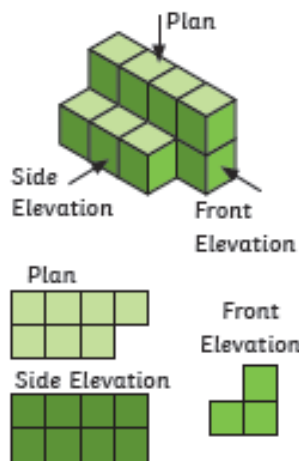
A polygon is any two-dimensional shape formed with straight lines.

In a regular polygon, all the sides and angles are equal.

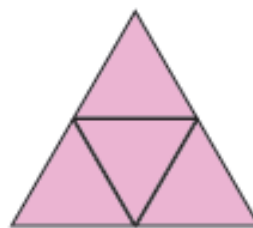
In an irregular polygon, the sides and angles are not equal.

Representations

Cube models can be drawn as 2D representations using different elevations.















A shape net is a 2D drawing of an unfolded 3D shape. When you are drawing or reasoning about shape nets, think carefully about where the edges of the faces meet.



Shape net of a tetrahedron.

Knowledge Organiser

Properties of 3D Shapes

| Name | Surfaces | | Edges | | Vertices | Picture |
|----------------------|----------|--------|-------|--------|----------|---|
| | Flat | Curved | Flat | Curved | | |
| sphere | 0 | 1 | 0 | 0 | 0 |  |
| cube | 6 | 0 | 12 | 0 | 8 |  |
| cuboid | 6 | 0 | 12 | 0 | 8 |  |
| cone | 1 | 1 | 0 | 1 | 0 |  |
| cylinder | 2 | 1 | 0 | 2 | 0 |  |
| square-based pyramid | 5 | 0 | 8 | 0 | 5 |  |
| tetrahedron | 4 | 0 | 6 | 0 | 4 |  |
| triangular prism | 5 | 0 | 9 | 0 | 6 |  |
| pentagonal prism | 7 | 0 | 15 | 0 | 10 |  |
| hexagonal prism | 8 | 0 | 18 | 0 | 12 |  |
| octagonal prism | 10 | 0 | 24 | 0 | 16 |  |
| octahedron | 8 | 0 | 12 | 0 | 6 |  |

A cone has an apex. This is because a vertex is the point where two straight edges meet and a cone has no straight edges.

Identifying Angles

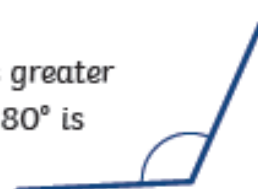
Acute Angles

Any angle that measures less than 90° is called an **acute** angle.



Obtuse Angles

Any angle that measures greater than 90° and less than 180° is called an **obtuse** angle.

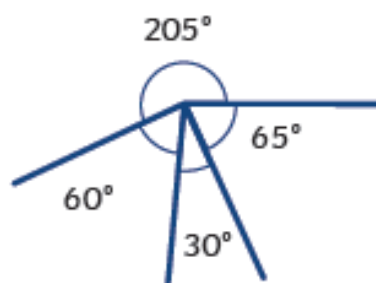


Reflex Angles

Any angle that measures greater than 180° is called a **reflex** angle.



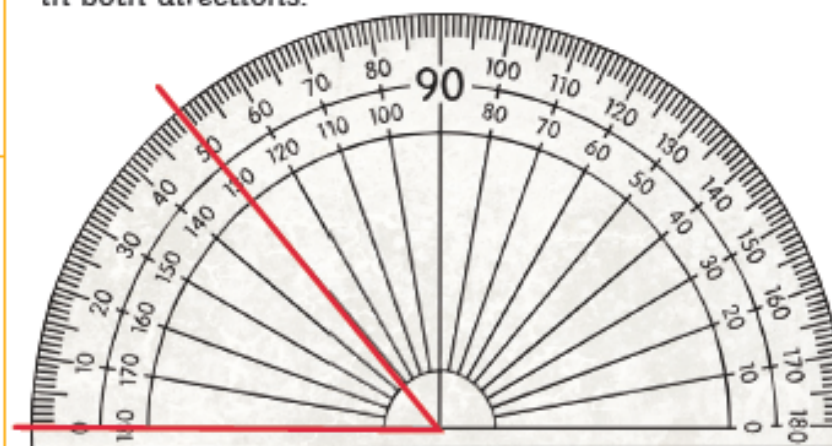
Angles on a straight line always total 180° .



Angles around a point always total 360° .

Measuring and Drawing Angles

To measure angles, we use a protractor. Look carefully at how the numbers on the scale count from 0° to 180° in both directions.



Multiples of 90° can be used as descriptions of a turn.



$\frac{1}{4}$ turn = 90°



$\frac{1}{2}$ turn = 180°

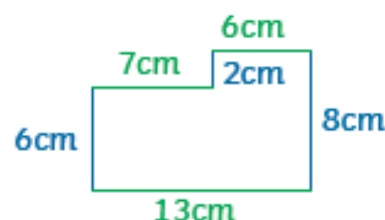


$\frac{3}{4}$ turn = 270°



1 turn = 360°

Using Properties of Rectangles



$$6\text{cm} + 2\text{cm} = 8\text{cm}$$

$$7\text{cm} + 6\text{cm} = 13\text{cm}$$

Position and Direction

Position and Direction

Knowledge Organiser

Key Vocabulary

coordinate

quadrant

x-axis

y-axis

reflection

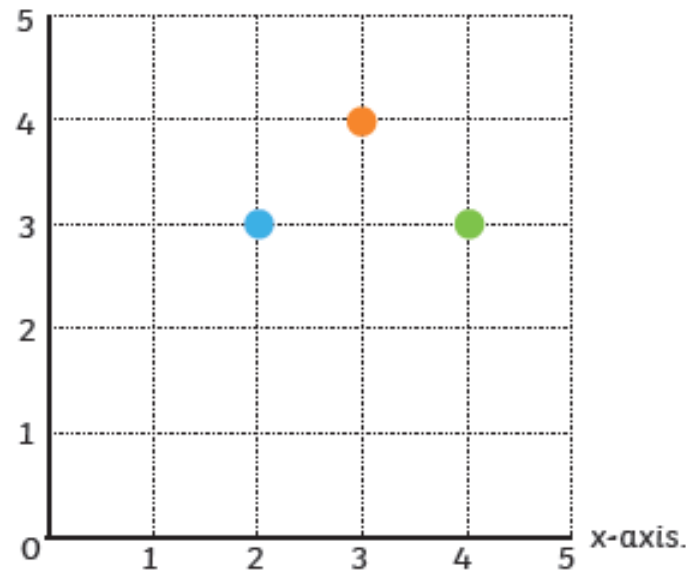
mirror line

translation

horizontal

vertical

y-axis.



Coordinates are a useful way to locate a position on a map or grid.

The numbers across the horizontal line of the grid are on the **x-axis**.

The numbers on the vertical line of the grid are on the **y-axis**.

We always read or write the number on the x-axis before the y-axis.

The x and y position are written in brackets with a comma.

The coordinate of the orange spot is **(3, 4)**.

To help you remember which point to read or write first, simply remember to move 'along the corridor and up the stairs'.

In other words, move on the **x-axis** and then move on the **y-axis**.

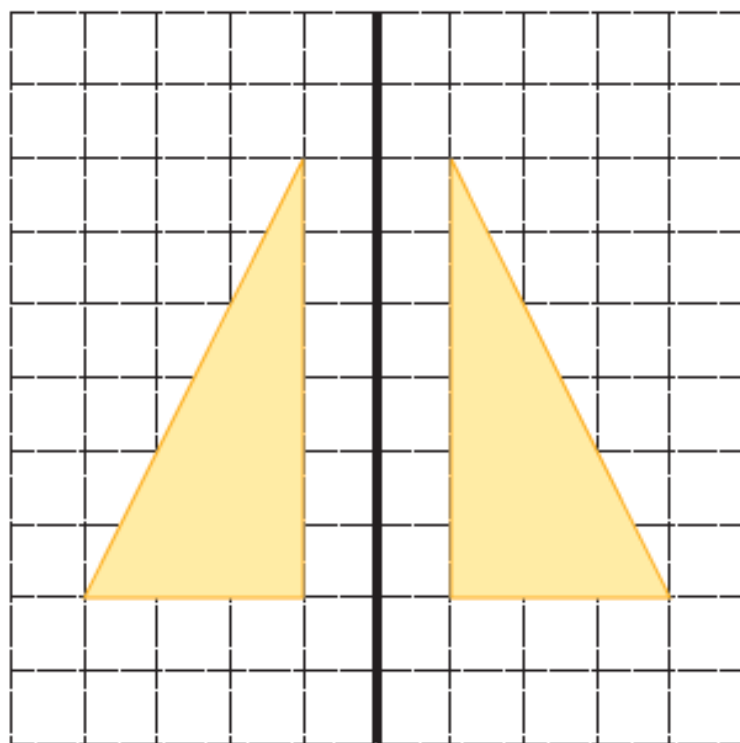


Position and Direction

Reflection

A shape is reflected when it is flipped over a mirror line.

The reflected image is congruent to the original. This means that the measurements of the sides and angles have not changed. Each point of the reflected shape is the same distance from the mirror line as the original shape.



Knowledge Organiser

Translation

In maths, translation means moving an object on a grid. The object is moved without changing the size, turning or reflecting it.

When translating an object on a grid, it can move up or down, left or right.

