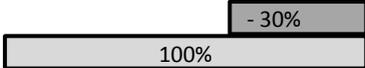
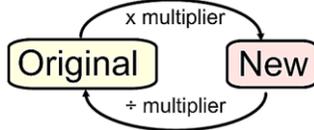


| Key Vocabulary       |   |
|----------------------|---|
| Proper fraction      | A fraction where the numerator is smaller than the denominator e.g. $\frac{2}{3}$   |
| Improper fraction    | A fraction where the numerator is bigger than the denominator e.g. $\frac{5}{2}$<br>Also known as a vulgar or top-heavy fraction  |
| Mixed Number         | A whole number and fraction together, e.g. $2\frac{1}{2}$<br>Improper fractions can be changed to mixed numbers and back again. $\frac{5}{2} = 2\frac{1}{2}$                              |
| Equivalent Fractions | Two fractions that represent the same amount. Multiplying or dividing the top and bottom of a fraction by the same number gives an equivalent fraction. Dividing gives a simpler fraction |
| Percentage           | A value out of 100. E.g. $23\% = \frac{23}{100} = 0.23$   |
| Increase             | Make a value bigger by a given fraction or percentage   |
| Decrease             | Make a value smaller by a given fraction or percentage  |
| Multiplier           | A decimal that can be used to multiply a given value to give the result of a percentage increase or decrease  |

| Key facts / Diagrams   |
|--|
| <p><b>Multiplier: (increasing)</b></p> <p>The value of Frank's house has gone up by 20% in this year. If the house was worth £150 000, how much is it worth now?<br/><i>(Increasing the whole amount by a further 20%)</i></p>  <p><math>100\% + 20\% = 120\%</math><br/>(as a decimal) multiplier <math>120\% = 1.2</math></p> <p><math>\pounds 150\ 000 \times 1.2 = \pounds 180\ 000</math></p> |
| <p><b>Multiplier: (decreasing)</b></p> <p>Shoes originally costing £75 is reduced by 30% in a sale. What is the sale price?<br/><i>(Decrease the whole by 30% : We are left with 70%)</i></p>  <p><math>100\% - 30\% = 70\%</math><br/>(as a decimal) multiplier <math>70\% = 0.7</math></p> <p><math>\pounds 75 \times 0.7 = \pounds 52.50</math></p>   |
| <p>Mrs Small invested £500 and it earns 8% interest per year. What is the total after 3 years?</p> <p><math>\pounds 500 \times 0.08 = \pounds 40 \times 3\text{years} = \pounds 120</math></p> <p>New amount<br/><math>\pounds 500 + \pounds 120 = \pounds 620</math></p>  |

| Common misconceptions  |
|--|
| <ul style="list-style-type: none"> <li>Some pupils may think that the multiplier for a 150% increase is 1.5</li> <li>Some pupils may think that increasing an amount by 200% is the same as doubling.</li> <li>In isolation, pupils may be able to solve original value problems confidently. However, when it is necessary to identify the type of percentage problem, many pupils will apply a method for a more simple percentage increase / decrease problem.</li> </ul> |

| Worked examples   |
|---|
| <p>Increase £120 by 150% :</p> <p><math>100\% + 150\% = 250\%</math><br/>Multiplier = <math>250\% = 2.5</math><br/><math>\pounds 120 \times 2.5 = \pounds 300</math></p> <p>Find the original amount:</p>  <p>Computer now costs £144. Price <u>INCREASED</u> by 20%.<br/>Multiplier is <math>120\% = 1.2</math><br/><math>\pounds 144 \div 1.2 = \pounds 120</math> (original amount)</p> <p>Shes now costs £38.50. Price <u>DECREASED</u> by 30%.<br/>Multiplier is <math>70\% = 0.7</math><br/><math>\pounds 38.50 \div 0.7 = \pounds 55</math> (original amount)</p> |