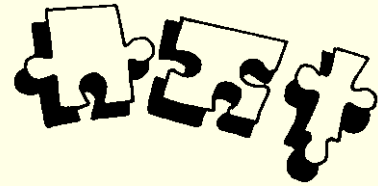


# 7.4

## Investigation: bits and pieces



### Algebra puzzles

<p><b>1</b> A pattern of numbers begins as 15, 23, 31, 39... The last number in the sequence is 143. How many numbers are in the sequence?</p> <p>_____</p>	<p><b>2</b> Write expressions for the total areas of each rectangle.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div> <p>_____</p> <p>_____</p>										
<p><b>3</b> Towns <i>A</i>, <i>B</i> and <i>C</i> are connected by three non-intersecting roads. A trip from town <i>A</i> to <i>C</i> via <i>B</i> is <math>2x + 4</math> km, a trip from <i>B</i> to <i>A</i> via <i>C</i> is <math>3x + 7</math> km, and a trip from <i>C</i> directly to <i>A</i> is <math>2x + 1</math> km. What is the distance between <i>A</i> and <i>B</i>? _____</p>	<p><b>4</b> There are <math>x</math> people hiring a bus to travel <math>D</math> kilometres. The total cost is <math>\\$C</math> plus <math>k</math> dollars per km. If the people share the cost of the hire evenly, then find an expression for each person's share in dollars.</p> <p>_____</p>	<p><b>5</b> Aaron is half as old as Darren. Darren is younger than Karen by 5 years. Sharon is <math>x</math> years older than Karen. If Sharon is <math>3x + 1</math> years old, write an expression for Aaron's age.</p> <p>_____</p>									
<p><b>6</b> Complete this magic square.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="text-align: center;">7</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;"><math>x - 1</math></td> <td style="text-align: center;">3</td> <td></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">-1</td> </tr> </tbody> </table>	7			$x - 1$	3				-1	<p><b>7</b> An empty bucket has a mass of <math>M</math> kg. When half-filled with water, it has a mass of <math>2M + 1</math> kg. What is its mass when it is full of water?</p> <p>_____</p>	<p><b>8</b> Twenty chairs can be placed around a row of six trapezoidal tables.</p> <p>How many chairs can be placed around a row of 50 tables? _____</p>
7											
$x - 1$	3										
		-1									
<p><b>9</b> Twelve sticks are needed to make this cube.</p> <p>Twenty sticks are needed to make these two cubes.</p> <p>Write an expression for finding the number of sticks needed to make <math>N</math> cubes.</p> <p>_____</p>	<p><b>10</b> Fill in the empty ovals.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><math>3p + 1</math> + <math>3p - 1</math></p> <p>↓ ↓</p> <p>○</p> </div> <div style="text-align: center;"> <p><math>6x</math> × <math>2x</math></p> <p>↓ ↓</p> <p>○</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p><math>b + 9</math> - ○</p> <p>↓ ↓</p> <p>○ <math>7 - b</math></p> </div> <div style="text-align: center;"> <p>○ ÷ <math>6y</math></p> <p>↓ ↓</p> <p>○ <math>3y</math></p> </div> </div>										
<p><b>11</b> Lee has <math>n</math> 10 cent coins and <math>n + 4</math> 20 cent coins. How much money does she have? _____</p>	<p><b>12</b> Tom went to sleep at <math>X</math> pm and woke <math>Y</math> am the next day. How long did he sleep? _____</p>	<p><b>13</b> If <math>\clubsuit\clubsuit\clubsuit\clubsuit</math> means 9 and <math>\clubsuit\clubsuit\clubsuit</math> means 6, then what does <math>\clubsuit\clubsuit\clubsuit</math> mean? _____</p>									