**Find a rule – two step**

1. Use the function machine to complete the table.

   ![Function machine diagram]

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>5</th>
<th>10</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>7</td>
<td>12</td>
<td>17</td>
<td>27</td>
<td>52</td>
<td>252</td>
</tr>
</tbody>
</table>

2. Here is the same function machine with the steps in the reverse order.

   ![Function machine diagram]

   Teddy: The outputs will be the same.

   Jack: The outputs will be different.

   Explain to a partner who you think is correct.

   Use the function machine to complete the table.

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>5</th>
<th>10</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>35</td>
<td>60</td>
<td>260</td>
</tr>
</tbody>
</table>

   Who is correct? **Jack**

3. Work out the missing outputs and inputs.

   **a)**
   
   ![Function machine diagram]

<table>
<thead>
<tr>
<th>input</th>
<th>1</th>
<th>5</th>
<th>8</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>output</td>
<td>9</td>
<td>29</td>
<td>44</td>
<td>39</td>
</tr>
</tbody>
</table>

   **b)**
   
   ![Function machine diagram]

<table>
<thead>
<tr>
<th>input</th>
<th>3</th>
<th>4</th>
<th>20</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>output</td>
<td>11</td>
<td>16</td>
<td>96</td>
<td>51</td>
</tr>
</tbody>
</table>

   **c)**
   
   ![Function machine diagram]

<table>
<thead>
<tr>
<th>input</th>
<th>13</th>
<th>3</th>
<th>12</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>output</td>
<td>5</td>
<td>0</td>
<td>4.5</td>
<td>8</td>
</tr>
</tbody>
</table>
4 Tick the pairs of function machines that will give the same outputs for a given input.

a) 

<table>
<thead>
<tr>
<th>Input</th>
<th>+ 3</th>
<th>+ 4</th>
<th>Output</th>
</tr>
</thead>
</table>

b) 

<table>
<thead>
<tr>
<th>Input</th>
<th>x 3</th>
<th>- 1</th>
<th>Output</th>
</tr>
</thead>
</table>

c) 

<table>
<thead>
<tr>
<th>Input</th>
<th>x 2</th>
<th>x 10</th>
<th>Output</th>
</tr>
</thead>
</table>

Explain your reasoning to a partner.

5 Here are some 2-step function machines.

For each machine, write a single step that would give the same output.

Check your answers by inputting values.

a) 

<table>
<thead>
<tr>
<th>Input</th>
<th>x 5</th>
<th>x 2</th>
<th>Output</th>
</tr>
</thead>
</table>

b) 

<table>
<thead>
<tr>
<th>Input</th>
<th>+ 12</th>
<th>- 2</th>
<th>Output</th>
</tr>
</thead>
</table>

6 Here is a function machine.

<table>
<thead>
<tr>
<th>Input</th>
<th>- 3</th>
<th>x 4</th>
<th>Output</th>
</tr>
</thead>
</table>

Can all 2-step function machines be written as a 1-step function machine?

Talk about it with a partner.

7 Mr Hall and Mrs Rose order some photos online.

a) Mr Hall orders 16 photos.

How much does he pay?

b) Mrs Rose pays £6.05

How many photos did she order?