

| Question | Answer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|--|----------|--------|----|--------|-----|------------|-------|--------|---|----|----|----|----|-----|-------|---|---|--------|---|------------|-------|--------|----|----|----|----|----|-----|-------|--|--|--------|----|-------|----------|---|---|---|----|-----|----|---|
| 1 | <p>a)</p> <table><tr><td>Input</td><td>1</td><td>2</td><td>3</td><td>5</td><td>10</td><td>50</td></tr><tr><td>Output</td><td>7</td><td>12</td><td>17</td><td>27</td><td>52</td><td>252</td></tr></table> <p>b) Jack The order of operations means that the outputs will be different, e.g. $1 \times 5 = 5$ and $5 + 2 = 7$ $1 + 2 = 3$ and $3 \times 5 = 15$</p> <p>c)</p> <table><tr><td>Input</td><td>1</td><td>2</td><td>3</td><td>5</td><td>10</td><td>50</td></tr><tr><td>Output</td><td>15</td><td>20</td><td>25</td><td>35</td><td>60</td><td>260</td></tr></table> <p>d) Jack</p> | Input | 1 | 2 | 3 | 5 | 10 | 50 | Output | 7 | 12 | 17 | 27 | 52 | 252 | Input | 1 | 2 | 3 | 5 | 10 | 50 | Output | 15 | 20 | 25 | 35 | 60 | 260 | | | | | | | | | | | | | | |
| Input | 1 | 2 | 3 | 5 | 10 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Output | 7 | 12 | 17 | 27 | 52 | 252 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input | 1 | 2 | 3 | 5 | 10 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Output | 15 | 20 | 25 | 35 | 60 | 260 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | <p>a)</p> <table><tr><td>input</td><td></td><td></td><td>output</td></tr><tr><td>1</td><td rowspan="4">$\times 5$</td><td rowspan="4">$+ 4$</td><td>9</td></tr><tr><td>5</td><td>29</td></tr><tr><td>8</td><td>44</td></tr><tr><td>7</td><td>39</td></tr></table> <p>b)</p> <table><tr><td>input</td><td></td><td></td><td>output</td></tr><tr><td>3</td><td rowspan="4">$\times 5$</td><td rowspan="4">$- 4$</td><td>11</td></tr><tr><td>4</td><td>16</td></tr><tr><td>20</td><td>96</td></tr><tr><td>11</td><td>51</td></tr></table> <p>c)</p> <table><tr><td>input</td><td></td><td></td><td>output</td></tr><tr><td>13</td><td rowspan="4">$- 3$</td><td rowspan="4">$\div 2$</td><td>5</td></tr><tr><td>3</td><td>0</td></tr><tr><td>12</td><td>4.5</td></tr><tr><td>19</td><td>8</td></tr></table> | input | | | output | 1 | $\times 5$ | $+ 4$ | 9 | 5 | 29 | 8 | 44 | 7 | 39 | input | | | output | 3 | $\times 5$ | $- 4$ | 11 | 4 | 16 | 20 | 96 | 11 | 51 | input | | | output | 13 | $- 3$ | $\div 2$ | 5 | 3 | 0 | 12 | 4.5 | 19 | 8 |
| input | | | output | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | $\times 5$ | $+ 4$ | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | 44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| input | | | output | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | $\times 5$ | $- 4$ | 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | 96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | 51 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| input | | | output | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | $- 3$ | $\div 2$ | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | 4.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Question | Answer | | | | | | | | | | |
|----------|---|-------|----|-----|----|----|--------|----|---|----|-----|
| 3 | <div><div><div><div>input</div><div>→</div><div>+ 3</div><div>→</div><div>+ 4</div><div>→</div><div>output</div></div><div>input</div><div>→</div><div>+ 4</div><div>→</div><div>+ 3</div><div>→</div><div>output</div></div><div><div><div>input</div><div>→</div><div>× 3</div><div>→</div><div>− 1</div><div>→</div><div>output</div></div><div>input</div><div>→</div><div>− 1</div><div>→</div><div>× 3</div><div>→</div><div>output</div></div><div><div><div>input</div><div>→</div><div>× 10</div><div>→</div><div>× 2</div><div>→</div><div>output</div></div><div>input</div><div>→</div><div>× 3</div><div>→</div><div>× 10</div><div>→</div><div>output</div></div><p>For two additions or two multiplications, it does not matter which order they are done in. Addition and multiplication are both commutative. For a multiplication and a subtraction, the order of operations does matter.</p></div> | | | | | | | | | | |
| 4 | <div>a) <table><tr><td>Input</td><td>10</td><td>3</td><td>13</td><td>73</td></tr><tr><td>Output</td><td>28</td><td>0</td><td>40</td><td>280</td></tr></table></div> <div>b) 4</div> | Input | 10 | 3 | 13 | 73 | Output | 28 | 0 | 40 | 280 |
| Input | 10 | 3 | 13 | 73 | | | | | | | |
| Output | 28 | 0 | 40 | 280 | | | | | | | |
| 5 | <div>a) £4.45</div> <div>b) 24</div> | | | | | | | | | | |
| 6 | <div>a) × 10</div> <div>b) + 10</div> <div>c) × 4</div> <div>No. Only two-step machines where both operations are addition/subtraction or multiplication/division can be written with one step.</div> | | | | | | | | | | |