<table>
<tr><th>Question</th><th>Scheme</th><th>Marks</th><th>AOs</th></tr>
<tr><td rowspan="5">11</td><td>$n = 3k + 1$ **or** $n = 3k + 2$
$n^2 - 1 = \ldots$</td><td>M1</td><td>3.1a</td></tr>
<tr><td>$n = 3k + 1 \Rightarrow n^2 - 1 = (3k+1)^2 - 1 = 9k^2 + 6k + 1 - 1 = 3(3k^2 + 2k)$
which is a multiple of 3
or
$n = 3k + 2 \Rightarrow n^2 - 1 = (3k+2)^2 - 1 = 9k^2 + 12k + 4 - 1 = 3(3k^2 + 4k + 1)$
which is a multiple of 3</td><td>A1</td><td>2.2a</td></tr>
<tr><td>$n = 3k + 1$ **and** $n = 3k + 2$
$n^2 - 1 = \ldots$</td><td>dM1</td><td>2.1</td></tr>
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which is a multiple of 3
and
$n = 3k + 2 \Rightarrow n^2 - 1 = (3k+2)^2 - 1 = 9k^2 + 12k + 4 - 1 = 3(3k^2 + 4k + 1)$
which is a multiple of 3
So if n is a positive integer that is not divisible by 3
then $n^2 - 1$ is divisible by 3</td><td>A1</td><td>2.4</td></tr>
<tr><td></td><td>**(4)**</td><td></td></tr>
<tr><td colspan="4" align="right">**(4 marks)**</td></tr>
<tr><td colspan="4" align="center">**Notes**</td></tr>
<tr><td colspan="4">M1: Sets $n = 3k + 1$ or $n = 3k + 2$ (or e.g. $n = 3k - 1$) and attempts $n^2 - 1$ or $(n-1)(n+1)$
A1: Achieves e.g. $3(3k^2 + 2k)$ or $3(3k^2 + 4k + 1)$ oe and deduces that it is a multiple of 3
dM1: A full and rigorous attempt at the proof considering **both** $n = 3k + 1$ and $n = 3k + 2$ oe valid expressions e.g. $n = 3k + 1$ and $n = 3k - 1$
A1: Fully correct work with valid reasons and a final conclusion</td></tr>
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