Activity 1:

Factorise the following expressions

1) \(x^2 - 25\)   2) \(x^2 - 100\)   3) \(x^2 - 900\)   4) \(x^2 - 1\)
5) \(x^2 - y^2\)   6) \(4x^2 - 9\)   7) \(16x^2 - 49\)   8) \(9x^2 - 16\)
9) \(25x^2 - y^2\)  10) \(x^2 - 9y^2\)  11) \(36x^2 - 49y^2\)  12) \(1600 - 9x^2\)

Activity 2:

Factorise the following expressions

1) \(2x^2 - 72\)   2) \(2x^2 - 200\)   3) \(2x^2 - 2\)   4) \(3x^2 - 48\)
5) \(5x^2 - 125\)  6) \(10x^2 - 90y^2\)  7) \(8x^2 - 50\)  8) \(27 - 3x^2\)
9) \(44x^2 - 176y^2\)  10) \(200x^2 - 1250\)

Activity 3:

Factorise the following expressions

1) \(x^4 - 25\)   2) \(x^4 - y^4\)   3) \(x^4 - 1\)   4) \(x^4 - 81\)
5) \(x^6 - 36\)  6) \(4x^4 - 9\)  7) \(25x^4 - 4y^4\)  8) \(x^6 - y^8\)
9) \(25x^6 - 1\)  10) \(x^2 - y^6\)

Activity 4:

Correct Helena’s homework

<table>
<thead>
<tr>
<th>Question 1</th>
<th>Question 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(x^2 - 25 = (x - 5)(x - 5))</td>
<td>(x^2 - a^2 = (x + y)(x - y))</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 3</th>
<th>Question 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(16x^2 - 25y^2 = (8x + 5y)(8y - 5y))</td>
<td>(x^2 + y^2 = (x - y)(x + y))</td>
</tr>
</tbody>
</table>

Activity 5:

David is certain that when he factorises \(x^2 + y^2\) that the answer is \((x+y)(x+y)\). Hannah believes the answer would be \((x-y)(x-y)\)

Show them that they are both incorrect.
Extension Task 1:

Explain what the picture above represents

Extension Task 2:

A lot of numbers can be written as the difference between two squares. For example,

\[ 15 = 8^2 - 7^2 \]
\[ 20 = 6^2 - 4^2 \]

• Can you write all the numbers from 1 to 30 as the difference of two squares?
• Investigate the odd numbers...
• Investigate the even numbers...
• Investigate any numbers that were not possible...

Extension Task 3:

\[ 55^2 - 45^2 = 1000 \]
\[ 105^2 - 95^2 = 2000 \]
\[ 85^2 - 65^2 = 3000 \]

• Can you find other multiples of 1000?
• Are there other ways of making 1000?