**Name:**

**Date:**

**Activity 5: Sum and Difference of Cubes**

**Part I (with CAS): From factored form to expanded form**

The following factored forms are different from those we’ve already encountered. Use the EXPAND command in your calculator to investigate whether the indicated multiplication of factors produces interesting results.

|  |  |
| --- | --- |
| Factored form | Expanded form displayed by the calculator |
| 1. |  |
| 2. |  |
| 3. |  |
| 4. |  |
| 5. |  |

**Part II (with paper & pencil and CAS): Constructing and testing a general algebraic rule**

II*a)* Notice the form of each expanded result displayed by the calculator. Describe how this form is related to that of the corresponding factors.

II*b)* State the regularity or patterns that you noticed (across the five examples) in terms of two general algebraic rules.

II*c)* Use paper and pencil to show that the rules you found in question *b* above work.

II*d)* How would you use your calculator to verify the algebraic rules you derived in question *b* above? Use the table below to show your work.

|  |  |
| --- | --- |
| What you enter into the CAS | What the CAS displays for the result |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## Classroom discussion of Parts I and II

##### **Part III (with paper & pencil): From expanded form to factored form**

III(A) Factor each of the following expressions completely, using only paper and pencil. Show all your work in the right-hand column below:

|  |  |
| --- | --- |
| Given expression | Work involved in factoring the given expression |
| 1. |  |
| 2. |  |
| 3. |  |

4. Explain how you used the identities for the sum and difference of cubes to factor the above

expressions.

|  |
| --- |
|  |

III(B) 1. Factor this expression using paper and pencil: .

|  |
| --- |
|  |

2. Which identities helped you to factor the expression in question B 1 above? Please explain how you

applied these identities.

|  |
| --- |
|  |

3. Factor this expression using paper and pencil: .

|  |
| --- |
|  |

4. Which identities helped you to factor the above expression, ? Please explain how you applied these identities.

|  |
| --- |
|  |

## Classroom discussion of Part III, A and B

**Part IV (Homework challenge with paper and pencil): Applying the identities**

Problem 1:

Pierre claims that, “For any two integers whose difference is 2, the difference of their cubes is always an even integer”.

Argue for or against Pierre’s claim. Show your work in the space below.

Problem 2:

Eric made the following assertion: “Any integer raised to the power of 6, from which 1 is then subtracted, is always divisible by one less than that integer as well as by one more than that integer”.

Argue for or against Eric’s assertion. Show your work in the space below.