

FACTORISATION

CLASS - 8

PREVIEW

- PART1 FACTORS OF NATURAL NOS N ALGEBRAIC EXPNS
- PART2 METHOD OF COMMON FACTORS
- PART3 FACTORISATION BY REGROUPING TERMS
- PART4 SOLVING SUMS ON FACTORIZING EXPNS
- PART5 SOLVING SUMS ON FACTORISATION USING IDEN
- PART6 FACTORS OF THE FORM $(x+a)(x+b)$
- PART7 DIVISION OF ALGEBRAIC EXPNS
- DOUBT s??????

Introduction

Factors of natural numbers

$$\text{e.g. } 90 = 2 \times 3 \times 3 \times 5$$

Factors of algebraic expressions

Terms are formed as product of factors.

$$\text{e.g. } 5xy = 5 \times x \times y$$

$$10x(x+2)(y+3) = 2 \times 5 \times x \times (x+2) \times (y+3)$$

Method of common factors

- We write each term as a product of irreducible factors. Then take out the common factors of the terms and write the remaining factors to get the desired factor form.
- E.g. $5ab+10a$
 $(5axb)+(10xa)$
 $(5axb) + (5ax2)$
 $5a(b+2)$ (desired factor form)

Factorisation by regrouping terms

- Regrouping is re-arranging the terms with common terms.

e.g. 1) $a^2 + ab$ + $8a + 8b$

$$a(a+b) + 8(a+b)$$

$$(a+b) (a+8)$$

2) $15ab - 6a$ + $5b - 2$

$$3a(5b-2) + 1(5b-2)$$

$$(3a+1) (5b-2)$$

Let us solve some examples



$$5m^2n - 15mn^2$$

$$5mn (m - 3n)$$

$$5 \times m \times n \times (m - 3n)$$

Factorise

$$a^2bc + ab^2c + abc^2$$

Take the common factors

$$abc (a + b + c)$$

$$a \times b \times c \times (a + b + c)$$

Factorise

$$15pq + 15 + 9q + 25p$$

- Regrouping like terms to find common factors

$$\underline{15pq + 9q} + \underline{25p + 15}$$

$$3q (5p + 3) + 5 (5p + 3)$$

$$(3q + 5) (5p + 3)$$

Factorisation using identities

- Observe the expression.
- If it has a form that fits the right hand side of one of the identities , then the expression corresponding to the left hand side of the identity gives the desired factorisation.
- $(a+b)^2 = a^2+2ab+b^2$
- $(a-b)^2 = a^2 -2ab+b^2$
- $(a^2-b^2) = (a+b)(a-b)$

Few examples

- 1) $p^2 + 8p + 16$

It is in the form of the identity $a^2 + 2ab + b^2$

therefore

$$p^2 + 2(p)(4) + 4^2$$

Since $a^2 + 2ab + b^2 = (a+b)^2$

By comparison

$$p^2 + 8p + 16 = (p + 4)^2$$

(required factorisation)

Factorise

$$49p^2 - 36$$

$$(7p)^2 - (6)^2$$

$$(7p+6)(7p-6)$$

$$a^2 - 2ab + b^2 - c^2$$

$$(a-b)^2 - c^2$$

$$(a-b-c)(a-b+c)$$

Factors of the form $(x+a)(x+b)$

- In general , for factorising an algebraic expression of the type x^2+px+q , we find two factors a and b of q (i.e. the constant term) such that

$$ab = q$$

$$a+b = p$$

$$a^4 - 2a^2b^2 + b^4$$

$$(a^2)^2 - 2a^2b^2 + (b^2)^2$$

$$(a^2 + b^2)^2$$

$$4x^2 - 8x + 4$$

$$4(x^2 - 2x + 1)$$

$$4(x^2 - x - x + 1)$$

$$4[x(x - 1) - 1(x - 1)]$$

$$4(x - 1)(x - 1)$$

$$4(x - 1)^2$$

$$p^2 + 6p + 8$$

$$p^2 + 4p + 2p + 8$$

$$p(p + 4) + 2(p + 4)$$

$$(p + 2)(p + 4)$$

$$a^2 - 10a + 21$$

$$a^2 - 7a - 3a + 21$$

$$a(a - 7) - 3(a - 7)$$

$$(a - 7)(a - 3)$$

Division of algebraic expressions

- Division of monomial by another monomial
- Division of polynomial by a monomial
- Division of polynomial by polynomial

Division of monomial by another monomial

$$6x^3 \div 2x$$

Now let us write the irreducible factor forms

$$6x^3 = 2 \times 3 \times x \times x \times x$$

$$2x = 2 \times x$$

$$\begin{aligned}\therefore 6x^3 &= 2 \times x \times (3 \times x \times x) \\ &= (2x) \times (3x^2)\end{aligned}$$

$$\therefore 6x^3 \div 2x = 3x^2$$

Division of polynomial by a monomial

$$(5x^2 - 6x) \div 3x$$

$$\frac{x(5x - 6)}{3 \times x}$$

$$\frac{(5x - 6)}{3}$$

$$\frac{(5x - 6)}{3}$$

$$3$$

$$(x^3 + 2x^2 + 3x) \div 2x$$

$$\frac{x(x^2 + 2x + 3)}{2 \times x}$$

$$2 \times x$$

$$\frac{(x^2 + 2x + 3)}{2}$$

$$2$$

Division of polynomial by polynomial

$$(y^2 + 7y + 10) \div (y + 5)$$

$$\frac{(y^2 + 5y + 2y + 10)}{(y + 5)}$$

$$\frac{[y(y + 5) + 2(y + 5)]}{(y + 5)}$$

$$\frac{(y + 5)(y + 2)}{(y + 5)}$$

$$(y + 2)$$

$$(m^2 - 14m - 32) \div (m + 2)$$

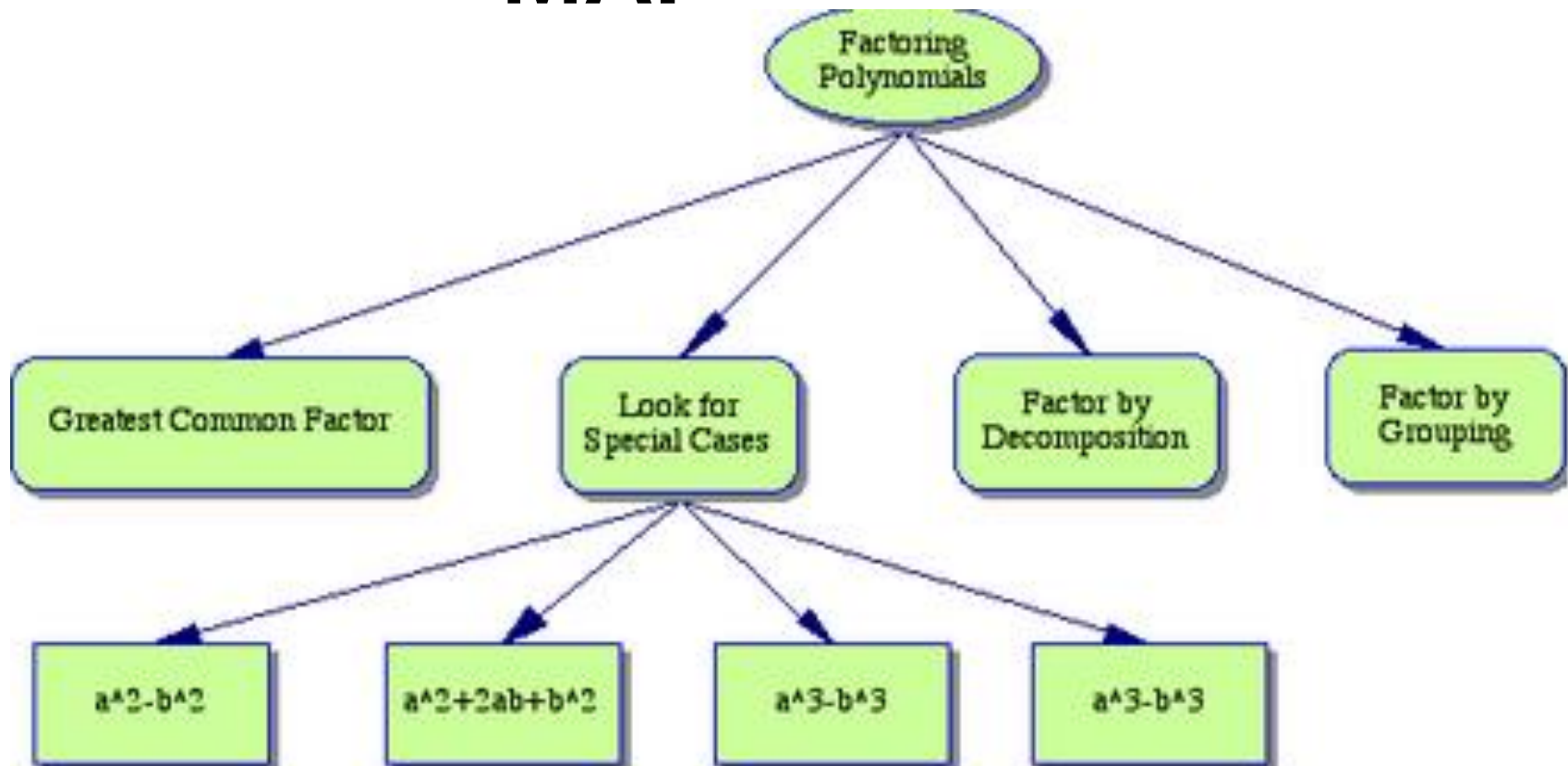
$$\frac{(m^2 - 16m + 2m - 32)}{(m + 2)}$$

$$\frac{[m(m - 16) + 2(m - 16)]}{(m + 2)}$$

$$\frac{(m - 16)(m + 2)}{(m + 2)}$$

$$(m - 16)$$

CONCEPT MAP



ANY DOUBTS?



THANK YOU !

