

Do Now: From yesterday's sheet #s 37-39

$$a^2 - b^2$$

37) $(x+2)^2 - (y-3)^2$ DOTS

$$\left(\begin{array}{c} a + b \\ (x+2) + (y-3) \end{array} \right) \left(\begin{array}{c} a - b \\ (x+2) - (y-3) \end{array} \right)$$
$$(x+y-1)(x-y+5)$$

38) $16 - (2x-1)^2$

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

$$(2x+3)(-2x+5)$$

or

$$-(2x+3)(2x-5)$$

39) $4a^2 - 4ab - 3b + b^2$

grouping doesn't work

$$\underbrace{4a^2 - 4ab + b^2} - 3b$$

$$(2a-b)^2 - 3b$$

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

We made it
into a
DOTS
problem

Name: _____
PCH: More Factoring Fun

Date: _____
Ms. Loughran

Factor each of the following completely.

1. $x^3 - 5x^2 - x + 5$

$$\begin{aligned} &x^2(x-5) - 1(x-5) \\ &(x^2-1)(x-5) \\ &(x-1)(x+1)(x-5) \end{aligned}$$

2. $x^4 - 2x^2 - 15$ "tweak" Am method

$$(x^2-5)(x^2+3)$$

3. $x^6 - 26x^3 - 27$

$$\begin{aligned} &(x^3-27)(x^3+1) \\ &(x-3)(x^2+3x+9)(x+1)(x^2-x+1) \end{aligned}$$

4. $x^6 + 2x^4 - 16x^2 - 32$

$$\begin{aligned} &x^4(x^2+2) - 16(x^2+2) \\ &(x^4-16)(x^2+2) \\ &(x^2+4)(x^2-4)(x^2+2) \\ &(x^2+4)(x-2)(x+2)(x^2+2) \end{aligned}$$

5. $x^4 - 13x^2 + 40$

$$(x^2-8)(x^2-5)$$

6. $x^9 - x^6 - x^3 + 1$

$$\begin{aligned} &x^6(x^3-1) - 1(x^3-1) \\ &(x^3-1)(x^6-1) \rightarrow \text{difference of cubes} \\ &(x-1)(x^2+x+1)(x^2-1)(x^4+x^2+1) \\ &(x-1)(x^2+x+1)(x-1)(x+1)(x^4+x^2+1) \end{aligned}$$

↑ we can factor further, to be continued...

OR

$$\begin{aligned} &(x^3-1)(x^6-1) \leftarrow \text{DOTS} \\ &(x^3-1)(x^3-1)(x^3+1) \\ &(x-1)(x^2+x+1)(x-1)(x^2+x+1)(x+1)(x^2-x+1) \\ &(x-1)^2(x^2+x+1)^2(x+1)(x^2-x+1) \end{aligned}$$

9. $4x^2 + 4x - 15$

$$(2x + 5)(2x - 3)$$

12. $16x^2 - 24x + 9$

$$(4x - 3)^2$$

check for
Perfect
square
trinomial

13. $4(a-b)^2 - 14(a-b) - 8$

$$\text{let } y = a - b$$

$$4y^2 - 14y - 8$$

$$2(2y^2 - 7y - 4)$$

$$2(2y + 1)(y - 4)$$

$$2(2(a-b) + 1)(a-b - 4)$$

$$2(2a - 2b + 1)(a - b - 4)$$

14. $3(3x+2)^2 + 5(3x+2) - 2$

$$\text{let } y = 3x + 2$$

$$3y^2 + 5y - 2$$

$$(3y - 1)(y + 2)$$

$$(3(3x+2) - 1)(3x+2 + 2)$$

$$(9x + 6 - 1)(3x + 4)$$

$$(9x + 5)(3x + 4)$$