

# Worksheet: Factoring by Grouping



**Q1:** Factorise fully  $x^3 + x - 130$ .

A  $(x - 5)(x^2 - 5x + 26)$

B  $(x + 5)(x^2 + 5x + 26)$

C  $(x - 5)(x^2 + 5x + 26)$

D  $(x - 5)(x^2 + 5x + 25)$



Question Video

**Q2:** Factorise fully  $x^3 - 2x^2 + 5x - 10$ .

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

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

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

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

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



Question Video

**Q3:** Factorise fully  $x^5 + 9x^2 - 8x^3 - 72$ .

A  $(x - 8)(x^2 + 9)$

B  $(x^2 - 8)(x^3 - 9)$

C  $(x^2 + 8)(x^3 + 9)$

D  $(x^2 - 8)(x^3 + 9)$



Question Video

**Q4:** Factorise fully  $z^3 + 6z^2 + 6 + z$ .

A  $(z + 1)(z^2 + 6)$

B  $(z^2 + 1)(z^2 + 6)$

C  $(z^2 + 1)(z + 6)$

D  $(z - 1)(z^2 + 6)$

E  $(z - 1)(z + 1)(z + 6)$



Question Video

**Q5:** Factorise fully  $x^2y^3 - 27x^2 - y^3 + 27$ .

A  $(x - 1)(x + 1)(y - 3)(y^2 - 3y + 9)$

B  $(x - 1)(x + 1)(y^2 - 3)$

C  $(x - 1)(x + 1)(y - 3)(y^2 + 3y + 9)$

D  $(x - 1)(x + 1)(y^2 + 3)$

E  $(x - 1)(x + 1)(y + 3)(y^2 - 3y + 9)$



Question Video

**Q6:** Expand  $a(a - 16b) + 64b^2 - 81$ , and then factorise the result completely.

A  $(a - 8b + 9)(a - 8b - 9)$

B  $(a + 8b + 9)(a + 8b - 9)$

C  $(a + 9b)(a - 9b)$

D  $(a - 8b - 9)^2$

E  $(a - 8b + 9)(a + 8b - 9)$



Question Video

**Q7:** Factorise fully  $x^5 - x^3 - x^2 + 1$ .

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

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

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

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

E  $(x^2 + 1)(x + 1)(x^2 + x + 1)$



Question Video

**Q8:** Expand and simplify  $a^3 - 9b^3 + ab(a - 9b)$ , then factorise the result.

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

B  $(a - b)(a + 3b)(a - 3b)$

C  $(a + b)(a + 3b)(a - 3b)$

D  $(a - 3b)^3$

E  $(a + b)(a + 3b)^2$

**Q9:** Factorise fully  $1 - x^2 + 14xy - 49y^2$ .

A  $(1 + x - 7y)(1 - x + 7y)$

B  $(1 + x - 7y)(1 - x - 7y)$

C  $(1 + x - 9y)(1 - x - 9y)$

D  $(1 + x - 9y)(1 - x + 9y)$



Question Video

**Q10:** Factorise fully  $a^3 + b^3 + a + b$ .

A  $(a + b)(a^2 + ab + b^2 - 1)$

B  $(a - b)(a^2 + ab + b^2 + 1)$

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

D  $(a + b)(a^2 - ab + b^2 + 1)$



Question Video

**Q11:** Factorise fully  $x^3 + 4x^2 - x - 4$ .

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

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

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

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

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



Question Video

**Q12:** Factorise fully  $4x^3(x + 2) - 16x^2 - 32x$ .

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

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

C  $x(x - 2)(x + 2)^2$

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

E  $4x(x + 2)(x^2 + 4)^2$

**Q13:** Factorise fully  $x^2(y - 5) - 9x(y - 5) + 18y - 90$ .

A  $(y - 5)(x + 2)(x + 9)$

B  $(y - 5)(x - 6)(x - 3)$

C  $(y + 5)(x - 6)(x - 3)$

D  $(y - 5)(x + 6)(x + 3)$

E  $(y - 5)(x + 1)(x + 18)$

**Q14:** Factor the expression  $3p(n^3 + 1) - n^3 - 1$  completely.

A  $(n^3 + 1)(3p + 1)$

B  $(3p - 1)(n^3 + 1)$

C  $n^3(3p - 1) + 3p - 1$

D  $(n^3 - 1)(3p - 1)$

E  $(n^3 - 1)(3p + 1)$

**Q15:** Factor the expression  $x^2(2x + 5) + 2x + 5$  completely.

A  $(2x + 5)(x^2 + 5)$

B  $(x^2 + 1)(2x + 5)$

C  $x^2(2x + 5)$

D  $2x^2(2x + 5)$

E  $(2x + 5)(x^2 + 2)$



Question Video

**Q16:** Factorise fully  $x^4 + 10x^3 + 40x + 4x^2$ .

A  $x(x - 10)(x^2 + 4)$

B  $x(x + 4)(x^2 + 10)$

C  $x(x + 10)(x^2 + 4)$

D  $(x^2 + 10)(x^2 + 4)$

E  $x(x - 4)(x^2 + 10)$

**Q17:** Factorise fully  $4x^2 + 8x - 32 - 5xy + 10y$ .

A  $(x - 2)(4x + 16 - 5y)$

B  $(x - 2)(4x + 4 - 5y)$

C  $(x - 2)(4x + 16 + 5y)$

D  $(x - 2)(4x - 4 - 5y)$

E  $(x + 2)(4x + 16 - 5y)$

**Q18:** If  $a + 20b = 11$  and  $x + y = 3$ , what is the value of  $ax + ay + 20bx + 20by$ ?

A 53

B 33

C 34

D 14

**Q19:** Factorise fully  $zb - zx + b - x$ .

A  $(x + 1)(z - b)$

B  $(z - 1)(x - b)$

C  $(z + 1)(b - x)$

D  $(x - 1)(b - z)$

E  $(b + 1)(z - x)$



Question Video

**Q20:** Factorise fully  $4xa + xb + 4ya + yb$ .

A  $(4a + b)(x + y)$

B  $(4x + y)(4a + b)$

C  $(4x + y)(a + b)$

D  $4(x + y)(a + b)$



Question Video

**Q21:** Factorise fully  $5z - 15y - bz + 3by$ .

A  $(3z + y)(b - 5)$

B  $(3z - y)(b - 5)$

C  $(3y - z)(b + 5)$

D  $(3y - z)(b - 5)$

E  $(3y + z)(b - 5)$

**Q22:** Factorise fully  $yx + 4x + 6y + 24$ .

A  $(x - 4)(y + 6)$

B  $(y + 4)(x + 24)$

C  $(y + 4)(x - 6)$

D  $(y + 4)(x + 6)$

E  $(x + 4)(y + 6)$

**Q23:** Factorise fully  $9xm - 4lz + 4lx - 9mz$ .

A  $(x - z)(9m - 4l)$

B  $(x - z)(9m + 4l)$

C  $(m - l)(9x + 4z)$

D  $(z - x)(9m + 4l)$

E  $(z - x)(9m - 4l)$

**Q24:** Factorise fully  $xyn^2 + yn - xn - 1$ .

A  $(yn - 1)(xn + 1)$

B  $(yn - 1)(n + 1)$

C  $(xn - 1)(yn - 1)$

D  $(yn - 1)(xn - 1)$

E  $(xn - 1)(yn + 1)$



**Q25:** Factorise fully  $xz + 15yu - 3zy - 5xu$ .

A  $(x + 3y)(z - 5u)$

B  $(x - 3y)(u - 5z)$

C  $(y - 3x)(z - 5u)$

D  $(x - 3y)(z - 5u)$

E  $(x - 3y)(u + 5z)$