Next is factoring by grouping.

↳ Make two groups of two terms.

$2x^2+8x+3x+12$

$= 2x(x+4)+3(x+4)$

when the expressions in the brackets are identical the grouping worked.

$= (x+4)(2x+3)$

the bracket is a common factor

$= (x+4)(2x+3)$

$3x^2+6x+4x+8$

$= 3x(x+2)+4(x+2)$

$= (x+2)(3x+4)$

$3x^2-6x-4x+8$

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

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

order can be changed as long as sign moves as well

$2x^2-3x-4x+6 = 2x^2-4x-3x+6$

$= x(2x-3) - 2(2x-3) = 2x(x-2) - 3(x-2)$

$= (2x-3)(x-2) = (x-2)(2x-3)$

2) $5d^3 + 45d^2 + 40d + 360$

$= 5(d^3 + 9d^2 + 8d + 72)$

$= 5(d^2(d+9) + 8(d+9))$

$= 5((d+9)(d^2+8))$

$= 5(d+9)(d^2+8)$

$= 5d^2(d+9) + 40(d+9)$

$= (d+9)(5d^2+40)$

$= (d+9)5(d^2+8)$

$= 5(d+9)(d^2+8)$