1. Factor $8x^3 + 27$ using the sum of two cubes. $a^3+b^3=(a+b)(a^2-ab+b^2)$

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

$(2x+3)((2x)^2-(2x)(3)+3^2)=(2x+3)(4x^2-6x+9)$

2. Factor $9k^3 - 27k^2 - 4k + 12$ using grouping and then the difference of two squares.

$9k^2(k-3)-4(k-3)$

$(9k^2-4)(k-3)$

$(3k-2)(3k+2)(k-3)$

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

$(3k)^2-2^2=(3k-2)(3k+2)$

3. Factor $12a^2 + 7a - 5$ using the method of your choice.

$12a^2-5a+12a-5$

$a(12a-5)+1(12a-5)$

$(12a-5)(a+1)$

$AC=-60$ $B=7$

$2\cdot2\cdot3\cdot5$

$1\cdot60$

$2\cdot30$

$3\cdot20$

$4\cdot15$

~~$5\cdot12$~~

$6\cdot10$

4. Factor $27x^3 - y^3$ using the difference of two cubes. $a^3-b^3=(a-b)(a^2+ab+b^2)$

$(3x)^3-y^3=(3x-y)((3x)^2+3xy+y^2)$

$(3x-y)(9x^2+3xy+y^2)$

5. Factor $x^2 - 7x + 12$ using guess and check.

$(x-4)(x-3)$

6. Factor $x^4 - 16$ using the difference of two squares twice. $a^2 - b^2 = (a-b)(a+b)$

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

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

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

7. Factor $3xy^3 + 3x$ using GCF and then the sum of two cubes.

$a^3+b^3 = (a+b)(a^2-ab+b^2)$

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

8. Factor $14k^2 - 39k + 10$ using the method of your choice.

$14k^2 - 4k - 35k + 10$

$2k(7k-2) - 5(7k-2)$

$(7k-2)(2k-5)$

$AC = 140 \quad B = -39$

$2 \cdot 7 \cdot 2 \cdot 5$

$1 \cdot 140$

$2 \cdot 70$

$-4 + -35$

$5 \cdot 28$

$7 \cdot 20$

$10 \cdot 14$

9. Factor $2x^2 + 3x - 5$ using guess and check.

$(2x+5)(x-1)$

10. Factor $2h^4 + 2h^3 - 8h^2 - 8h$ using GCF, then grouping, then the difference of two squares.

$2h(h^3+h^2-4h-4)$

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

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

$2h(h+1)(h-2)(h+2)$