

1)  $6x^2 + 11x + 4$

Sum of products:  $24$

1	24
2	12
3	8
4	6

$\frac{6x^2}{3x} + \frac{3x}{3x} + \frac{8x}{4} + \frac{4}{4}$

$\frac{3x(2x+1) + 4(2x+1)}{2x+1}$

$(2x+1)(3x+4)$

2)  $5x^2 + 14x + 8$

Sum of products:  $40$

1	40
2	20
4	10
5	8

$\frac{5x^2}{x} + \frac{4x}{x} + \frac{10x}{2} + \frac{8}{2}$

$\frac{x(5x+4) + 2(5x+4)}{5x+4}$

$(5x+4)(x+2)$

3)  $\frac{12x^2}{3} + \frac{24x}{3} - \frac{63}{3}$

Factor out 3:  $3[4x^2 + 8x - 21]$

Sum of products:  $84$

1	84
2	42
3	28
4	21
-6	+14
7	12

$\frac{4x^2}{2x} - \frac{6x}{2x} + \frac{14x}{7} - \frac{21}{7}$

$\frac{2x(2x-3) + 7(2x-3)}{2x-3}$

$3(2x-3)(2x+7)$

Rules for Factoring:

1. GCF?
2. 2 terms?
  - ↳ difference of squares?
3. 3 terms?
  - $x^2 + \dots$
  - ↳ factor directly
  - $5x^2 + \dots$
  - ↳ factor by grouping
4. 4 terms?
  - factor by grouping

4)  $3x^2 - 25x - 18$

↙ diff ↘

$$\frac{3x^2}{x} + \frac{2x}{x} - \frac{27x}{-9} - \frac{18}{-9}$$

$$\frac{x(3x+2)}{3x+2} - \frac{9(3x+2)}{3x+2}$$

54  
1 54  
+2 -27  
3 18  
6 9

$(3x+2)(x-9)$

7)  $\frac{3k^2}{k} + \frac{2k}{k} - \frac{21k}{-7} - \frac{14}{-7}$

$$\frac{k(3k+2)}{3k+2} - \frac{7(3k+2)}{3k+2}$$

$(3k+2)(k-7)$

5)  $5n^2 - 8n + 3$

↙ sum ↘

$$\frac{5n^2}{n} - \frac{3n}{n} - \frac{5n}{-1} + \frac{3}{-1}$$

$$\frac{n(5n-3)}{5n-3} - \frac{1(5n-3)}{5n-3}$$

15  
1 15  
-3 -5

$(5n-3)(n-1)$

8)  $\frac{6x^2}{x} - \frac{x}{x} - \frac{30x}{-5} + \frac{5}{-5}$

$$\frac{x(6x-1)}{6x-1} - \frac{5(6x-1)}{6x-1}$$

$(6x-1)(x-5)$

6)  $\frac{-15x^3}{-5x} + \frac{65x^2}{-5x} - \frac{60x}{-5x}$

↙ sum ↘

$$-5x[3x^2 - 13x + 12]$$

↙ ↘

$$\frac{3x^2}{x} - \frac{4x}{x} - \frac{9x}{-3} + \frac{12}{-3}$$

$$\frac{x(3x-4)}{3x-4} - \frac{3(3x-4)}{3x-4}$$

36  
1 36  
2 18  
3 12  
-4 -9  
6 6

$-5x(3x-4)(x-3)$

9)  $\frac{10jk}{2k} - \frac{6k}{2k} + \frac{5j}{1} - \frac{3}{1}$

$$\frac{2k(5j-3)}{5j-3} + \frac{1(5j-3)}{5j-3}$$

$(5j-3)(2k+1)$