Expansions

1. $(a+b)^2 = a^2 + 2ab + b^2$

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

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

4. $(a+b)^2 - (a-b)^2 = 4ab$

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

6. $(a+b)^3 = a^3 + b^3 + 3ab(a+b)$
   $= a^3 + b^3 + 3a^2b + 3ab^2$

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

8. $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$
   $= a^2 + b^2 + c^2 + 2(ab + bc + ca)$

9. $\left(a + \frac{1}{a}\right)^2 = a^2 + \frac{1}{a^2} - 2$

10. $\left(a - \frac{1}{a}\right)^2 = a^2 + \frac{1}{a^2} - 2$

11. $\left(a + \frac{1}{a}\right)^2 + \left(a - \frac{1}{a}\right)^2 = 2\left(a^2 + \frac{2}{a}\right)$

12. $(x+a)(x+b) = x^2 + (a+b)x\ ab$

13. $(x+a)(x-b) = x^2 + (a-b)x - ba$

Date / /

14 $(x-\cancel{a})(x-b) = x^3 + (b-b)x - ab$

15 $(x-a)(x-b) = x^2 - (a+b)x + ab$

17 $a^3+b^3+c^3-3abc = (a+b+c)(a^2+b^2+c^2-ab-bc-ac)$

~~18~~

Date / /

Ex 4a

2

i $\left(\frac{7}{8}x+\frac{4}{5}y\right)^2$

using the identity $(a+b)^2=a^2+2ab+b^2$

$a=\frac{7}{8}x \quad b=\frac{4}{5}y$

$\therefore \left(\frac{7}{8}x+\frac{4}{5}y\right)^2=\left(\frac{7}{8}x\right)^2+2\times\frac{7}{8}x\times\frac{4}{5}y+\left(\frac{4}{5}y\right)^2$

$=\frac{49x^2}{64}+\frac{7}{5}xy+\frac{16y^2}{25}$

ii $\left(\frac{2x}{7}-\frac{7y}{4}\right)^2$

using identity $(a-b)^2=a^2+b^2-2ab$

$\left(\frac{2x}{7}-\frac{7y}{4}\right)^2=\left(\frac{2x}{7}\right)^2+\left(\frac{7y}{4}\right)^2-2\left(\frac{2x}{7}\times\frac{7y}{4}\right)$

$\therefore \left(\frac{2x}{7}+\frac{7y^2}{4}\right)^2=\left(\frac{2}{7}x\right)^2-2\times\frac{2}{7}\times\frac{7}{4}y+\left(\frac{7}{4}y\right)^2$

$=\frac{4x^2}{49}-xy+\frac{49}{16}y^2$

Date / /

3 using identity $(a+b)^2-(a-b)^2$

$(a+b)^2-(a-b)^2=4ab$

$a=\frac{a}{2b},\ b=\frac{2b}{a}$

$\left(\frac{a}{2b}+\frac{2b}{a}\right)^2-\left(\frac{a}{2b}-\frac{2b}{a}\right)^2$

$=4\times\frac{a}{2b}\times\frac{2b}{a}=4$

$\left(\frac{a}{2b}+\frac{2b}{a}\right)^2-\left(\frac{a}{2b}-\frac{2b}{a}\right)^{2}-4$

$4-4=0$