

# 7 MUST KNOW QUESTIONS TO CONQUER EXPANSION & FACTORISATION

1	Simplify $(3x - 5)(x - 6) - x(3x - 4)$ .	
2	Factorise completely (a) $12x^2 - 21x + 9$ , (b) $15ax - 10ay - 21bx + 14by$ .	
3	(a) Expand and simplify the expression $(2p - 3q^2) - (p + q)^2$ . (b) Factorise the expression completely $2x^3 - 50x$ . (c) If $4(x - y)^2 = 328$ and $xy = 24$ , find the value of $3x^2 + 3y^2$ .	
4	(a) Simplify $x^2 - (x - 1)^2 + (x - 2)^2 - (x - 3)^2$ . (b) Hence, find the value of $2020^2 - 2019^2 + 2018^2 - 2017^2$ .	
5	Factorise each of the following expressions completely. (a) $6x^2 - 9x - 42$ (b) $pq - 4p - 12 + 3q$	
6	Factorise the following expressions completely. (a) $9x^2 - 225$ (b) $3a - 6b + 2bc - ca$	
7	(a) Expand $(a + b)(a - b)$ . (b) Without using a calculator, use algebraic rules to evaluate $\frac{121}{121^2 - 125 \times 117}$ .  Leave your answer as a fraction.	

**Answer Key**

1	Solution: $30 - 19x$ $(3x - 5)(x - 6) - x(3x - 4)$ $3x^2 - 18x - 5x + 30 - 3x^2 + 4x$ $30 - 19x$
2	Ans: (a) $3(4x - 3)(x - 1)$ (b) $(5a - 7b)(3x - 2y)$
3	Solutions:  (a) $(2p - 3q^2) - (p + q)^2$ $= (2p - 3q^2) - (p^2 + 2pq + q^2)$ $= 2p - 3q^2 - p^2 - 2pq - q^2$ $= 2p - 4q^2 - p^2 - 2pq$  (b) $2x^3 - 50x$ $= 2x(x^2 - 25)$ $= 2x(x + 5)(x - 5)$  (c) $(x - y)^2 = 82$ $= x^2 - 2xy + y^2 = 82$ $= x^2 - 48 + y^2 = 82$ $= x^2 + y^2 = 130$ $= 3x^2 + 3y^2 = 390$
4	Solutions:  (a) $x^2 - (x^2 - 2x + 1) + x^2 - 4x + 4 - (x^2 - 6x + 9)$ $= 2x - 1 - 4x + 4 + 6x - 9$ $= 4x - 6$ or $(x - x + 1)(x + x - 1) + (x - 2 - x + 3)(x - 1 + x - 3)$ $= 2x - 1 + 2x - 5$ $= 4x - 6$  (b) $4(2020) - 6 = 8074$
5	Solutions:  (a) $3(2x^2 - 3x - 14)$ $= 3(2x - 7)(x + 2)$  (b) $p(q - 4) + 3(q - 4)$ $= (q - 4)(p + 3)$

6	<p>Solutions:</p> <p>(a) <math>9(x + 5)(x - 5)</math>  <math>9x^2 - 225</math>  <math>= (3x)^2 - (15)^2</math>  <math>= (3x + 15)(3 - 15)</math>      <b>or</b>      <math>9x^2 - 225</math>  <math>= 9(x + 5)(x - 5)</math>      <math>= 9(x^2 - 25)</math>  <math>= 9(x + 5)(x - 5)</math></p> <p>(b) <math>(3 - c)(a - 2b)</math>    or <math>(a - 2b)(3 - c)</math></p> <p><b><u>Method 1</u></b>  <math>3a - 6b + 2bc - ca</math>  <math>= 3a - ca + 2bc - 6b</math>  <math>= a(3 - c) + 2b(c - 3)</math>  <math>= a(3 - c) - 2b(3 - c)</math>  <math>= (3 - c)(a - 2b)</math></p>
7	<p>Solution:</p> <p>(b) <math>\frac{121}{121^2 - 125 \times 117} = \frac{121}{121^2 - (121 + 4)(121 - 4)}</math>  <math>= \frac{121}{121^2 - (121^2 - 4^2)}</math>  <math>= \frac{121}{121^2 - 121^2 + 4^2}</math>  <math>= \frac{121}{16}</math></p> <p>Ans: (a) <math>a^2 - b^2</math> (b) <math>\frac{121}{16}</math></p>