FACTORISING EXPRESSIONS

Answer all of these questions. Remember to show your working out in all questions.

MAIN QUESTIONS

1. $6x + 9$ | $3(2x + 3)$
2. $4y^2 - 16$ | $4(y^2 - 4)$
3. $x^2 - 9$ | $(x + 3)(x - 3)$
4. $25a^2 - 16b^2$ | $(5a + 4b)(5a - 4b)$
5. $x^2 + 7x + 12$ | $(x + 3)(x + 4)$
6. $y^2 - 5y + 6$ | $(y - 2)(y - 3)$
7. $z^2 + 2z - 15$ | $(z + 5)(z - 3)$
8. $2x^2 + 8x + 6$ | $2(x^2 + 4x + 3)$
9. $3a^2 - 12a + 9$ | $3(a^2 - 4a + 3)$
10. $4b^2 + 20b + 25$ | $(2b + 5)^2$
11. $6x^2 - 24$ | $6(x^2 - 4)$
12. $x^2 + 11x + 30$ | $(x + 5)(x + 6)$
13. $y^2 - 8y + 15$ | $(y - 3)(y - 5)$
14. $z^2 + z - 12$ | $(z + 4)(z - 3)$
15. $2x^2 + 14x + 20$ | $2(x^2 + 7x + 10)$
16. $3a^2 - 15a + 18$ | $3(a^2 - 5a + 6)$
17. $4b^2 - 12b + 9$ | $(2b - 3)^2$
18. $5x^2 - 45$ | $5(x^2 - 9)$
19. $x^2 + 13x + 42$ | $(x + 6)(x + 7)$
20. $y^2 - 10y + 21$ | $(y - 3)(y - 7)$
21. $z^2 + 3z - 28$ | $(z + 7)(z - 4)$
22. $2x^2 + 16x + 30$ | $2(x^2 + 8x + 15)$
23. $3a^2 - 21a + 30$ | $3(a^2 - 7a + 10)$
24. $4b^2 + 28b + 49$ | $(2b + 7)^2$
25. $6x^2 - 54$ | $6(x^2 - 9)$
26. $x^2 + 17x + 72$ | $(x + 8)(x + 9)$

27. $y^2 - 12y + 35$ | $(y - 5)(y - 7)$

28. $z^2 + 5z - 36$ | $(z + 9)(z - 4)$

29. $2x^2 + 22x + 48$ | $2(x^2 + 11x + 24)$

30. $3a^2 - 27a + 54$ | $3(a^2 - 9a + 18)$

MASTER QUESTIONS

M1. A rectangle has an area expressed as $x^2 + 8x + 15$. Factorise this expression to find possible dimensions. | $(x + 3)(x + 5)$

M2. The area of a square garden is $4x^2 + 20x + 25$. Factorise to find the side length. | $(2x + 5)$

M3. A number squared minus 9 times the number plus 20 equals zero. Factorise to find possible values. | $(x - 4)(x - 5) = 0$

M4. The product of two consecutive odd numbers is 143. Form and factorise an equation to find the numbers. | $x^2 + 2x - 143 = 0$ factors to $(x + 13)(x - 11) = 0$

M5. A right-angled triangle has sides measuring x, x+1, and x+2. Using Pythagoras' theorem, form and factorise an equation. | $x^2 + (x+1)^2 = (x+2)^2$ simplifies to $x^2 - 2x - 3 = 0$ factors to $(x - 3)(x + 1) = 0$

M6. The area of a photo frame is $2x^2 + 12x + 16$. Factorise to find possible dimensions if the length is 2cm more than the width.

$2(x^2 + 6x + 8) = 2(x + 2)(x + 4)$

M7. A number is 5 less than its square. Form and factorise an equation to find the number.

$x^2 - x - 5 = 0$ factors to $(x - (1+\sqrt{21})/2)(x - (1-\sqrt{21})/2) = 0$

M8. The sum of a number and its reciprocal is 2.5. Form and factorise an equation to find the number.

$x + 1/x = 2.5$ becomes $2x^2 - 5x + 2 = 0$ factors to $(2x - 1)(x - 2) = 0$

M9. A car travels at speed x km/h for 2 hours, then at (x+10) km/h for 3 hours, covering 210km total. Form and factorise an equation.

$2x + 3(x+10) = 210$ becomes $5x + 30 = 210$ factors to $5(x + 6) = 210$

M10. The difference between a number and its square root is 6. Form and factorise an equation after substitution.

Let $y = \sqrt{x}$, then $y^2 - y - 6 = 0$ factors to $(y - 3)(y + 2) = 0$