

Boost Free Lessons - Year 9 Maths

Lesson 20: Factorising Monic Quadratic Trinomials

Name: _____ Grade: _____ Date: _____

Worked Example 1

Factorise $x^2 + 7x + 12$

1. This is monic, because the coefficient of x^2 is 1.
2. Look for two numbers that **multiply** to 12 and **add** to 7.
3. Test the factor pairs of 12: 1 and 12 add to 13, 2 and 6 add to 8, 3 and 4 add to 7 (correct).
4. Put those two numbers into the brackets, then check by expanding.

$$= (x + 3)(x + 4)$$

Worked Example 2

Factorise $x^2 - 2x - 15$

1. Look for two numbers that multiply to -15 and add to -2 .
2. The product is negative, so one number must be positive and the other negative.
3. Test the pairs: 1 and -15 add to -14 , -1 and 15 add to 14, 3 and -5 add to -2 (correct).
4. Check by expanding: $(x + 3)(x - 5) = x^2 - 5x + 3x - 15$ (correct).

$$= (x + 3)(x - 5)$$

Remember: For a monic trinomial, find two numbers that **multiply** to the constant and **add** to the coefficient of x . If the constant is negative, one number is positive and the other is negative.



Question 1: Factorise the following.

1. $x^2 + 5x + 6$

2. $x^2 + 8x + 15$

3. $x^2 + 9x + 20$

4. $x^2 + 6x + 8$

5. $x^2 + 10x + 21$

6. $x^2 + 7x + 10$

7. $x^2 + 11x + 24$

8. $x^2 + 12x + 35$

9. $x^2 + 4x + 3$

10. $x^2 + 13x + 36$



Question 2: Factorise the following.

1. $x^2 - 5x + 6$

2. $x^2 - 7x + 12$

3. $x^2 + 2x - 8$

4. $x^2 - 3x - 10$

5. $x^2 - x - 12$

6. $x^2 + 5x - 14$

7. $x^2 - 9x + 18$

8. $x^2 - 4x - 21$



Question 3: Answer the following questions.

1. Factorise $x^2 - 16$ using the difference of two squares.
2. Factorise $x^2 + 6x + 9$ and describe what is special about the answer.
3. A rectangle has area $x^2 + 9x + 18$. Write expressions for its length and width.
4. Factorise $x^2 - 100$.
5. Factorise $x^2 + x - 30$, then check your answer by expanding.





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Answers: Factorising Monic Quadratic Trinomials**Question 1**

1. $(x + 2)(x + 3)$
2. $(x + 3)(x + 5)$
3. $(x + 4)(x + 5)$
4. $(x + 2)(x + 4)$
5. $(x + 3)(x + 7)$
6. $(x + 2)(x + 5)$
7. $(x + 3)(x + 8)$
8. $(x + 5)(x + 7)$
9. $(x + 1)(x + 3)$
10. $(x + 4)(x + 9)$

Question 2

1. $(x - 2)(x - 3)$
2. $(x - 3)(x - 4)$
3. $(x + 4)(x - 2)$
4. $(x - 5)(x + 2)$
5. $(x - 4)(x + 3)$
6. $(x + 7)(x - 2)$
7. $(x - 3)(x - 6)$
8. $(x - 7)(x + 3)$

Question 3

1. $(x + 4)(x - 4)$
2. $(x + 3)^2$, which is a perfect square
3. $(x + 3)$ and $(x + 6)$
4. $(x + 10)(x - 10)$
5. $(x + 6)(x - 5)$, and expanding gives $x^2 + x - 30$ (correct)

