



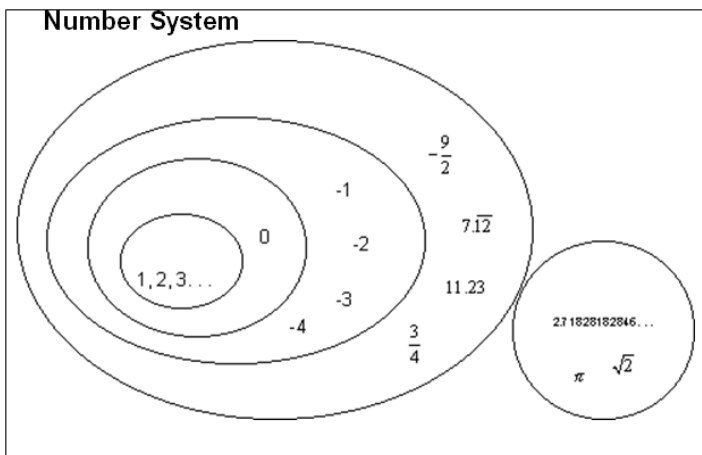
Big idea

Most of the relationships in real life are **non linear**, which means equations are not very simple anymore. To help you with this complication, we will begin with algebra skills which you will see throughout high-school math.



Feedback & Assessment of Your Success

Date	Pages	Topics	Finished assignment pages?	Summarized notes in a journal?	How many extra practice questions did you try in each topic?	Tentative TEST date:
			Made corrections?	Added your own explanations?		Questions to ask the teacher:
2days	2-5	Simplify Polynomials (MPM) Journal #1				
4days	6-13	Factoring Methods (MPM) Journal #2,3				
2days	14-16	Completing the square (MPM) Journal #4				



ASSIGNMENT Simplify Polynomials (MPM)

Simplify.

1. $(2xy)(5yx^2)$

2. $(8x^2y^3)(-2x^3y^5)$

3. $18x^2y^5 \div 6x^2y^3$

4. $-20x^8y^4z^3 \div -4x^3y^2$

5. $3x + 6y + 4x + 3y + 2x^2 + 5x + 4x^2 - 3x$

6. $-2xy + 5x^3 + 2x(4xy) - xy + x(10x^2) - 6y(-3x^2)$

7. $(4x + 5y) + (3x - 2y)$

8. $(3x^2 - 6x) - (-5x - 9x^2)$

9. $-2x^2(4x + 5)$

10. $3x^2y^3(-2x^2y + 2xy^4 + 3)$

Show how to multiply two binomials using two methods

11. $2(x + 3)(x + 2)$

Using diagram

Using FOIL

Expand.

12. $3(5x - 2)(3x + 5)$

13. $(x + 3)(x + 7) - (x + 5)^2$

14. $(3x - 5)^2$

15. $-(x - 5)(x + 5)$

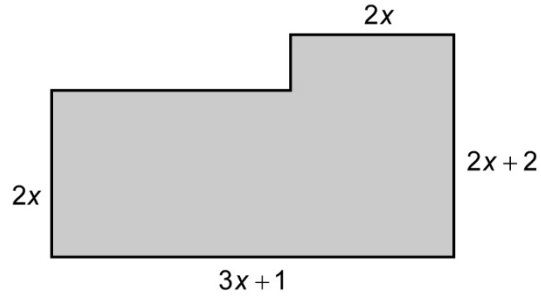
16. $2(x - 5)^2 - 4$

17. $(\frac{8}{9}a^2 + b - 6) - (\frac{5}{4}b + 3c - 2a^2 - 9)$

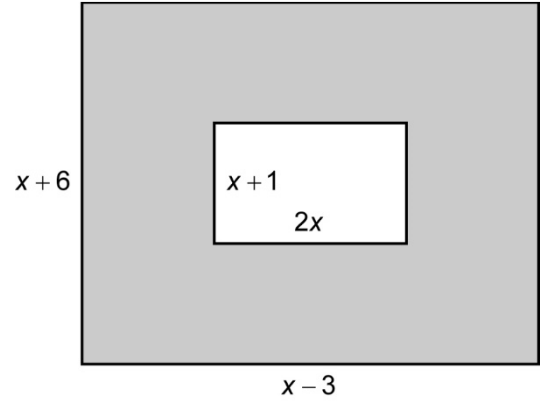
18. $(x + 2)^3 - 6(-x^2 + x - 4)^2$

Write and simplify an expression to represent the area of each shaded region.

19.



20.



21. A rectangular prism has a width of x centimetres. Its length is 4 cm more than its width and its height is 5 cm more than its width.
- Draw a diagram of the prism.
 - Write a simplified expression for the volume of the prism.
 - Write a simplified expression for the surface area of the prism

22. Expand and simplify.

a) $(6g - 7h)(6g + 7h)$

b) $(3x + y)(3x - y)$

c) $(g - 9x)(g + 9x)$

23. Expand and simplify.

a) $(8a - 1)^2$

b) $(2u - 3v)^2$

c) $(6p + 7)^2$

24. What is the patterns you notice in the two previous questions?

25. Expand and simplify. Use the patterns as shortcuts when possible.

a) $(4x^2 + 3y^2)^2$

b) $(3x^2 + 2y^2)(3x^2 - 2y^2)$

c) $(x - 3)^2 - (x + 3)(x - 3)$

26. A cube has length, width, and height of x metres. Each dimension is increased by y metres.

a) Write a simplified formula for the volume of the new cube.

b) Write a simplified formula for the surface area of the new cube.

ASSIGNMENT Factoring: GCF & Grouping (MPM)

Factor fully

1. **a)** $3x + 6y$

b) $17ac - 34ad$

c) $-16x^2y^2 - 24xy$

d) $27x^3y^3 + 18x^2y^2 + 9xy$

e) $6n^2p^2 + 12np^2 + 36n^3p^3$

f) $33c^4d^3e^2 - 11c^2de$

g) $3g^2 + 6g + 9$

h) How can you check your answer?

2. **a)** $2x(x + 7) + 3(x + 7)$

b) $4s(r + u) - 3(r + u)$

c) $3x(6 - y) + 2(y - 6)$

d) $2y(x - 3) + 4z(3 - x)$

3. Factor by grouping.

a) $ax + ay + 3x + 3y$

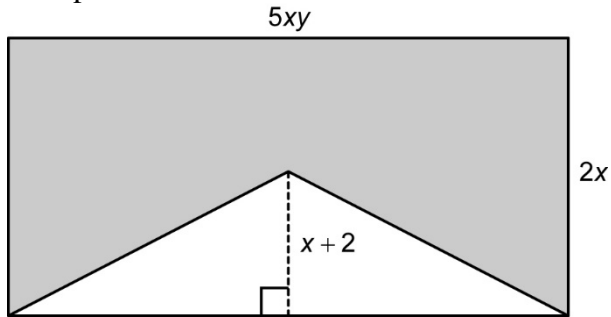
b) $4x^2 + 6xy + 12y + 8x$

c) $y^2 + 3y - ay - 3a$

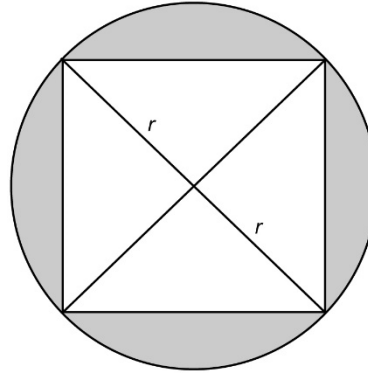
d) $25x^2 - 5x - 15xy + 3y$

Write an expression in factored form for the area of each shaded region.

4.



5.



6. The formula for the surface area of a rectangular prism is $SA = 2lw + 2lh + 2wh$.
- Write this formula in factored form.
 - If l is 10 cm, w is 5 cm, and h is 8 cm, find the surface area using both the original formula and the factored form. What do you notice? Explain why this is so.

7. Factor

a) $x^2y^3z - 2xy^2$

b) $12x(3y-8) + 17y(8-3y)$

✗ c) $25j^3 + 15j^2 - 5j - 3$

✗ d) $64d^3 - 40d^2 - 24d + 15$

ASSIGNMENT Factoring: Trinomials (MPM)**Simple Trinomials form ax^2+bx+c where $a=1$**

1. Find two integers with the given product and sum.
 - a) product = 48 and sum = 14
 - b) product = -15 and sum = 2
 - c) product = -30 and sum = -1
2. Determine two values of b so that each expression can be factored.
 - a) $x^2 + bx - 12$
 - b) $x^2 - bx + 18$

Determine two values of c so that each expression can be factored.

 - c) $x^2 + 4x + c$
 - d) $x^2 - 9x + c$
3. Factor, if possible.
 - a) $x^2 + 8x + 12$
 - b) $c^2 - 3c - 18$
 - c) $d^2 - 12d + 35$
 - d) $x^2 + x + 1$
 - e) $c^2 + 13c - 30$
 - f) How can you check your answers?
4. Factor fully by first removing the greatest common factor (GCF).
 - a) $3x^2 - 12x - 36$
 - b) $-2x^2 + 2x + 4$
 - c) $6x^2 - 42x + 72$
 - d) $-3x^2 - 18x - 24$
 - e) $x^3 + 7x^2 + 12x$

Complex Trinomial form ax^2+bx+c where $a \neq 1$

5. Factor

a) $2x^2 + 7x + 3$

Decomposition method

Criss-cross method

Australian method

b) $56x^2 - 9x - 2$

Decomposition method

Criss-cross method

Australian method

6. Factor using your favourite method

a) $6x^2 + 10x - 4$

b) $12c^2 - 26c - 16$

c) $6x^2 - 5xy - 4y^2$

7. We will always use the Criss Cross method in class, From now on use that only for complex trinomials.

a) $12r^2 + 7rs - 10s^2$

b) $10x^4 - 3x^2 - 18$

c) $20x^6 - 59x^3y^2 + 42y^4$

8. Factor fully

a) $6x^2 - 33x + 36$

b) $14x^2 - 62x - 40$

c) $15a^2 - 25ab - 10b^2$

d) $8x^2 - 22xy - 21y^2$

e) $m^4 - 9m^2 - 112$

9. The area of a rectangular parking lot is represented by $A = 6x^2 - 19x - 7$.

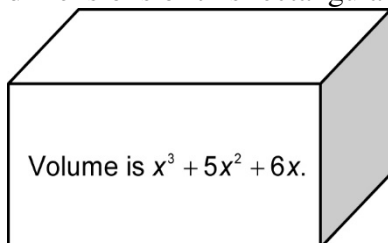
a) Factor the expression to find expressions for the length and width.

b) If x represents 15 m, what are the length and width of the parking lot?

10. Sydney Harbour Bridge in Australia is unusually wide for a long-span bridge. It carries two rail lines, eight road lanes, a cycle lane, and a walkway.

a) Factor the expression $10x^2 - 7x - 3$ to find binomials that represent the length and the width of the bridge.b) If x represents 50 m, what are the length and the width of the bridge, in metres?

11. Determine expressions to represent the dimensions of this rectangular prism.



ASSIGNMENT Factoring Special Products (MPM)

1. Factor these binomials _____

a) $4x^2 - 25$
rewriting as a trinomial

formula

b) $121x^2 - 9y^2$

c) $100r^2 + 81s^2$

d) $25x^2 - 16y$

e) $x^2 - 7$

f) $100 - (x - 3)^2$

g) $(5c + 3)^2 - (2c + 1)^2$

2. Factor these trinomials _____

a) $4x^2 - 12xy + 9y^2$
usual trinomial method

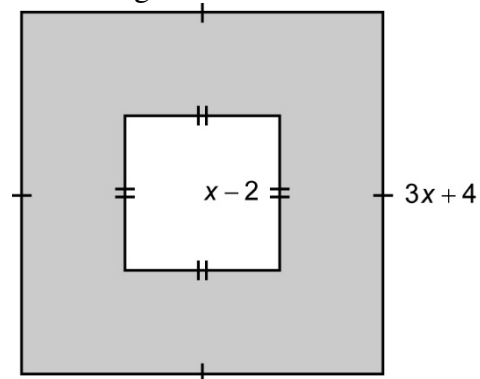
formula

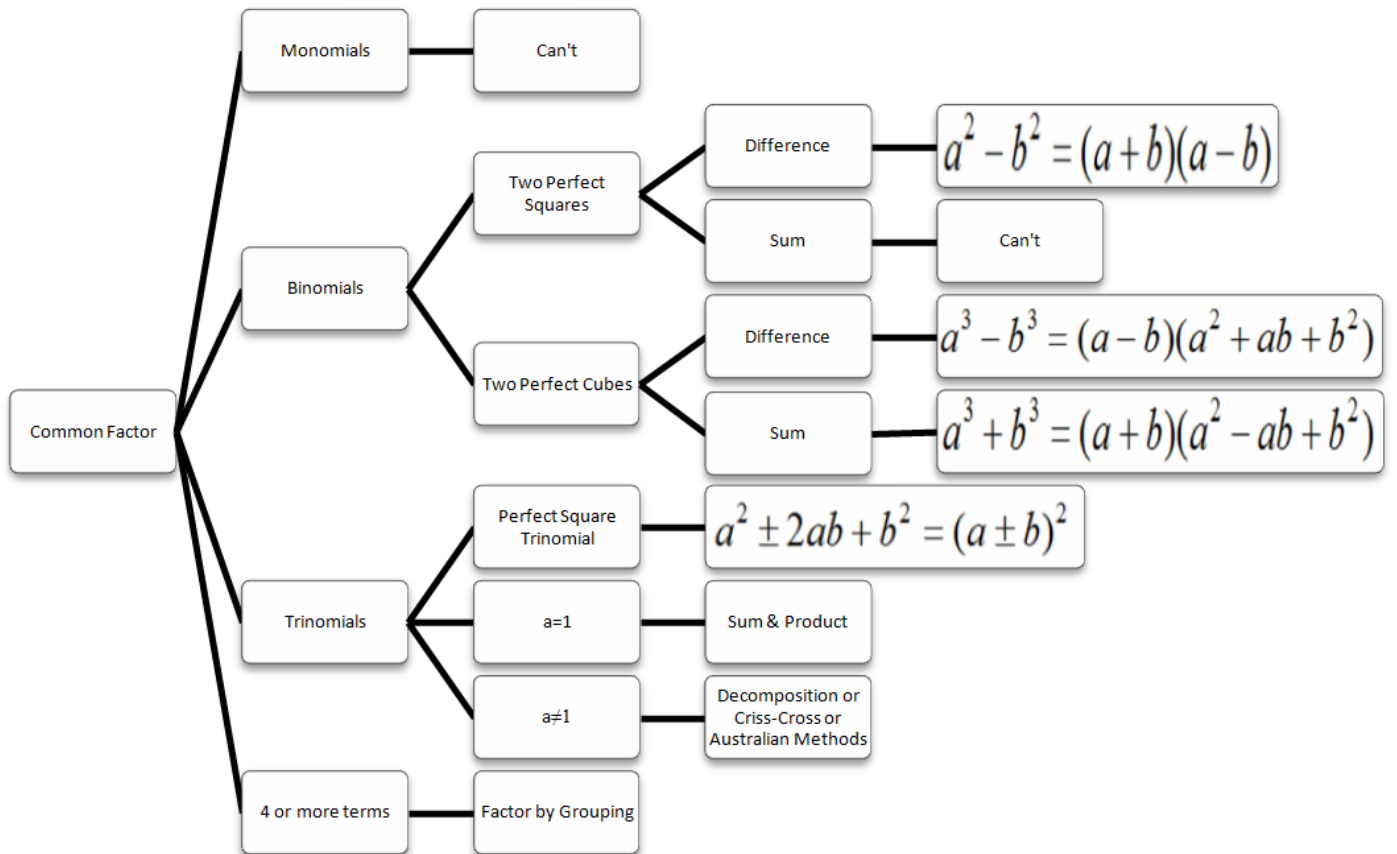
b) $100 - 20x + x^2$

c) $49x^2 + 70xy + 16y^2$

d) $25x^2y^2 - 150xyab^2 + 225a^2b^4$

3. Find an algebraic expression for the area of the shaded region in factored form.



ASSIGNMENT Factoring: MIX (MPM)

Factor fully

1. $2a^2 + 12a + 18$

4. $9x^3y - 16xy^3$

2. $x^2 - 3x - 18$

5. $9x^2 - 30x - 24$

3. $4x^2 - 1$

6. $25x^2 + 70xy + 49y^2$

7. $4s(r + u) - 3(r + u)$

14. $25x^2 - 1$

8. $18x^2 - 9x - 2$

15. $3x^5 - 12x^2$

9. $6s^4 - 29s^2 + 35$

16. $25 - 250x - x^2 + 10x^3$

10. $12c^{10} - 26c^5d^3 - 16d^6$

17. $x^2 + 12x + 27$

11. $25x^2 - 5x - 15xy + 3y$

18. $2x^2 + 6x + 56$

12. $5x^2 + 70x - 225$

19. $2x^2 + 7x + 3$

13. $16x^4 - 8x^2 + 1 - 9x^6$

20. $x^8 - 256y^8$

Completing the Square

STEPS with example

$$-3x^2 + 24x - 1$$

Complete the square no fractions

1. $x^2 + 10x - 10$

2. $4x^2 - 32x + 17$

3. $-5x^2 - 10x - 30$

Complete the square WITH fractions

4. $\frac{2}{3}x^2 - 12x - 20$

5. $2x^2 - 10x + 12$

6. $-3x^2 + 8x - 15$

Complete the square to Solve

7. $x^2 - 36 = 0$

8. $x^2 + 6x - 16 = 0$

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

10. $2x^2 + 5x = 7$

11. $-x^2 + 5x - 5 = 0$

12. $2x^2 - 8 = 6x$