GRADE 11 STUDY GUIDE | 2025

Measurement and Algebra Review

Mathematics

1. Surface Area and Volume

Cylinder: V = pi*r^2*h | SA = 2*pi*r^2 + 2*pi*r*h

Cone: V = (1/3)*pi*r^2*h | SA = pi*r^2 + pi*r*l (l = slant height)

Sphere: V = (4/3)*pi*r^3 | SA = 4*pi*r^2

Pyramid: V = (1/3)*base area*h | SA = base area + (1/2)*perimeter*slant height

- Always check units -- convert to the same unit before calculating
- l (slant height) of a cone: l = sqrt(r^2 + h^2)
- Volume in cm^3, convert to litres: 1 litre = 1000 cm^3

2. Algebraic Expressions -- Review

Factoring Techniques

- Common factor: 6x^2 + 9x = 3x(2x + 3)
- Difference of squares: a^2 - b^2 = (a+b)(a-b)
- Sum/difference of cubes: a^3 + b^3 = (a+b)(a^2-ab+b^2)
- Trinomial: ax^2 + bx + c -- find factors of ac that sum to b
- Grouping: four terms -- factor pairs then common bracket

Algebraic Fractions

Factor numerator and denominator, then cancel common factors. For addition/subtraction: find LCD first.

Example: Simplify: (x^2 - 4)/(x^2 - 4x + 4)

Numerator: (x+2)(x-2)

Denominator: (x-2)^2

Simplified: (x+2)/(x-2)

3. Equations and Inequalities

Quadratic Equations

Standard: ax^2 + bx + c = 0

Formula: x = (-b +/- sqrt(b^2 - 4ac)) / 2a

-

Factoring: fastest when applicable; set each factor to zero
- Completing the square: transform to $(x+p)^2 = q$ form
- Quadratic formula: always works, works even for irrational roots

Quadratic Inequalities

Solve the equality first (find roots). Then test a value in each interval, or use the parabola shape.

Example: Solve $x^2 - x - 6 < 0$

Roots: $x=3$ or $x=-2$ (from $(x-3)(x+2)=0$)

Parabola opens upward => negative between roots

Answer: $-2 < x < 3$

Simultaneous Equations

Linear + quadratic: substitute the linear into the quadratic. You will get a quadratic to solve, giving up to 2 solution pairs.