

Revision Paper 13: Algebra I

- Expansion
- Factorisation
- Algebraic Manipulation (addition, subtraction, multiplication and division of algebraic fractions)
- Change of subject of Formula

Expand and simplify the following

Q1 $-2a - [a + b - 2(b - c)]$

Q2 $2(6x - 5) - 5(2x - 4)$

Q3 $(2x - 3)(3x - 1) + 11x - 3$

Q4 $4(2x + 1)^2 - (2x - 1)^2$

Q5 $(3x - 8)(3x + 2)$

Q6 (a) $3(2x + y) - 4(y - x)$

(b) $2(3a + b) - 3[3(a - 3b) - 4(2a - b)]$

Q7 $(2x - 1)(x + 3)$

Q8 $(2a + 3b)(6a - 2)$

Q9 $(2xy + 3x^2 + 2)(5x^2y - y)$

Q10 $(x - 1)(x + 5) - (x - 3)$

Q11 $(x + 1)(x^2 - x + 2)$

Q12 $(a + 3)(a - 3) + (a - 5)(a^2 + 3a - 1)$

Q13 $\left(\frac{2}{5}x^3\right)\left(\frac{1}{3}x^3\right)$

Q14 $\left(x^2 - \frac{1}{4}\right)\left(x + \frac{1}{2}\right)$

Q15 $(x + 1)^2$

Q16 Using algebraic rules only, evaluate 299^2 without the use of a calculator.

Q17 If $(a - b)^2 = 52$ and $ab = -9$, calculate the value of $2a^2 + 2b^2$.

Q18 (a) Simplify $(x + 1)^2 - (x - 1)^2$.

(b) Using results from part (a), find the exact value of $10001^2 - 9999^2$.

Q19 If $a^2 + b^2 = 260$ and $ab = 112$, evaluate the following:

(a) $(a - b)^2$,

$\frac{(a + b)^2}{2}$

(b) $\frac{(a + b)^2}{2}$.

Factorise completely

Q20 $(4p - 2q) - 5r(q - 2p)$

Q21 (i) $2x^2 - 50$,

(ii) $3ac - 9c - 4ab + 12b$.

Q22 (i) $2xy + 6x$,

(ii) $3x^2 - 9x$,

(iii) $4y^2 - 36$.

Q23 (i) $5x^2y^2 - 18x^2y$,

(ii) $9wx^2 - 3y + 27yx^2 - w$,

(iii) $y^2 - 7y + 10$.

Q24 (i) $x^2 + 12x - 45$

(ii) $4x^3 - 8x^2 - x + 2$

(iii) $a^2 - 4ab + 4b^2 - 16$

Q25 (i) $18x^3 - 8$.

(ii) $2x^2 - 7x - 22$.

Q26 (i) $x^2 - 36y^2$,

(ii) $6ax + 3ay + 2bx + by$.

Q27 (i) $8x^3y^3 - 18xy^2$

(ii) $a^2 + 2ab + b^2 - c^2$

Q28 $x^4 - x^2 + x - 1$

Q29 $ab^3 - 4a - ab^2c^2 + 4ac^2$

Q30 $3x^2 + 10xy + 8y^2$

Express as a single fraction in its simplest form

Q31 $\frac{x-11}{x^2-2x-3} + \frac{2}{x-3}$

$\frac{1}{2} + \frac{2}{x}$

Q32 $\frac{3}{t+5} - \frac{2t}{t^2-25}$

Q37 $\frac{\pi}{2} + 2$

Q33 $\frac{3x}{x^2+2x-3} - \frac{2}{1-x}$

Q38 $\frac{2a-2b}{25} + \frac{a^2-2ab+b^2}{3(a+b)^2}$

Q34 $\frac{1}{2} \left(\frac{11x}{15} + \frac{8}{5} \right) - \frac{2+x}{2} - \frac{2x-3}{5}$

Q39 $\frac{a+4}{2a^2+6a} + \frac{a+4}{4(a+3)} \times \frac{a+6}{a^2+5a-6}$

Q35 $\frac{3x}{x-3} - \frac{2}{9-x^2}$

Q40 $\left(\frac{16a^4}{9b^3} \right)^{\frac{1}{2}} \times \frac{10ab^2}{27}$

Q36 $(m^2 - m - 6) \times \frac{m^2}{m^2 + 2m}$

Q41 Given that $\sqrt{\frac{x+y}{x-y}} = z$, make y the subject.

Q42 Given that $1 = \frac{1+n}{m} + n$, express n in terms of m .

Q43 Given that $P = a + \frac{bv^2}{k}$, express v in terms of P , a , b and k .

Q44 Given the formula $y = \frac{2x-3}{x+2}$, express x in terms of y .

Q45 Given that $q = \frac{5\sqrt{s+t}}{r}$, express t in terms of q , r and s .

Q46 Make x the subject of the following formulae $x = 3\sqrt{2x^2 - y}$

Q47 Make x the subject of the formula $y = \frac{a^2 + x^2}{2x^2}$

Q48 Given that $y = 2\sqrt{\frac{z-7y}{2x}}$ express z in terms of x and y .

Q49 Given that $2x - \pi\sqrt{\frac{y-z}{x}}$, express y in terms of x , z and π .

Q50 Given $f = \sqrt{\frac{h}{x^2} + g^2}$, express x in terms of f , g and h .