

Algebra Revision 1

1) Multiplying Brackets:

(a) $5p(p - 3q)$ (b) $4(3a - 2b) - 3(a - 4b)$ (c) $(x - 2y)(3x + 4y)$

2) Factorising (into one bracket):

(a) $15p - 9q$ (b) $x^2 + 5x$ (c) $8a^2 - 12ab$

3) Factorising (into two brackets):

(a) $x^2 + 11x + 28$ (b) $x^2 - 13x + 30$ (c) $x^2 - 13x - 30$

4) Factorising (difference of two squares):

(a) $x^2 - 49$ (b) $x^2 - 100$

5) Solving equations with brackets:

(a) $3(4x+5) = 4x+3$ (b) $2(3x - 4) = 5(x + 2)$

6) Simultaneous equations:

(a) $5x + 2y = 20$ (b) $4x + 3y = 9$ (c) $2x - 3y = 11$
 $3x + 2y = 14$ $x - 3y = 21$ $3x + y = 11$

7) Simplifying Algebraic Fractions:

(a) $\frac{x^2+9x+14}{x^2-4}$ (b) $\frac{x^2-25}{x^2-8x+15}$

[Hint: factorise the top and the bottom, then cancel.]

8) Solving quadratic equations (by factorising):

(a) $x^2 - 11x + 30 = 0$ (b) $x^2 - 8x - 20 = 0$

9) Solving quadratic equations (by the formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$):

(a) $2x^2 - 7x + 3 = 0$ (b) $2x^2 - 5x - 4 = 0$ (answers to 2dp)

10) Solving problems using quadratic equations:

A rectangular flowerbed 4m by 6m is surrounded by a path x metres wide.
 The area of the path is 96m^2 . How wide is the path?

Algebra Revision 2

1) (a) Simplify:

(i) $\frac{x^2-4x}{x^2-16}$ (ii) $\frac{3}{x-2} - \frac{2}{x+5}$ (iii) $\frac{2}{x-2} - \frac{1}{x^2-4}$

(b) Simplify: (i) $(x^{1.5})^2$ (ii) $\frac{x^{\frac{2}{3}} \times x^{\frac{1}{3}}}{x^{-2}}$ (iii) $\sqrt{x^{10}}$

2) Rearrange each of these formulae to make r the subject:

(i) $S = 2ar + c$ (ii) $d = \frac{2ab}{r}$ (iii) $A = 2r^2$ (iv) $M = \frac{1+ar}{1-r}$

3) If y is directly proportional to the square of x, and $y = 20$ when $x = 4$, find the value of y when $x = 6$.

4) If y is inversely proportional to the square root of x, and $y = 40$ when $x = 25$, find the value of y when $x = 256$.

5) (a) Complete the following table for the equation $4x - 3y = 6$

x	-3	-2	-1	0	1	2	3
y	-6						

(b) Draw a graph of this straight line.

(c) What is the gradient of this line?

(d) Write the equation of the line in the form "y = mx + c"

(e) On the same axes draw the straight line $y = -2x + 3$

(f) On your graph, label R the region where $4x - 3y < 6$ AND $y < -2x + 3$

6) (a) Draw up a table for the equation $y = x^3 - 3x + 4$, for $-3 \leq x \leq 3$.

(b) Draw axes labelled from -6 to 6 on x, and -15 to 21 on y.

Plot the graph of $y = x^3 - 3x + 4$ on your axes.

(c) By drawing suitable straight lines on your graph, solve the equations:

(i) $x^3 - 3x + 4 = 5$

(ii) $x^3 - 5x + 1 = 0$

Algebra Revision 3

- 1) Factorise:
 (a) $x^2 - 4x - 12$ (b) $4x^2 - 49$ (c) $2x^2 - 11x + 12$
 (d) $4x^2 - 36x$ (e) $5x^3 - 15x^2 + 10x$
- 2) Use your answers to Q1 to solve the equations:
 (a) $x^2 - 4x - 12 = 0$ (b) $4x^2 - 49 = 0$ (c) $2x^2 - 11x + 12 = 0$
 (d) $4x^2 - 36x = 0$

3) Simplify: (a) $\frac{5}{x-3} - \frac{3}{x-2}$ (b) $\frac{x+2}{x-5} - \frac{3}{x}$

4) Solve, giving answers to 2 decimal places: $3x^2 = 4x + 5$

- 5) Tickets were on sale for the school play at two prices: £2 or £3. Altogether 140 tickets were sold, and the total money taken was £340. If x of the £2 tickets and y of the £3 tickets were sold, form two equations in x and y . Solve the equations simultaneously to find the number of each type of ticket sold.

- 6) The sides of a rectangle are $(x - 3)$ cm and $(x + 2)$ cm and its area is 84cm^2 . Show that $x^2 - x - 90 = 0$. Hence find the value of x .

- 7) Rearrange each of these formulae to make h the subject:

(i) $A = \frac{3}{4}h^2$ (ii) $R = \sqrt{\frac{p}{h}}$ (iii) $M = \frac{a+2h}{a-h}$

8) Simplify: (i) $(x^6)^{\frac{1}{3}}$ (ii) $\frac{x^{\frac{3}{2}} \times x^2}{x^{-\frac{1}{2}}}$ (iii) $\frac{1}{\sqrt{x^{-8}}}$

- 9) (a) Complete the following table for the equation $4x - 3y = 6$

x	-3	-2	-1	0	1	2	3
y	-6						

- (b) Draw axes from -6 to 6 on x and -8 to 8 on y , and a graph of this straight line.

- (c) On the same axes draw the straight line $y = -2x + 3$

- (d) On your graph, label R the region defined by:
 $4x - 3y < 6$ AND $y < -2x + 3$ AND $x > -2$

Algebra Revision 4

Formulae, negative numbers etc

- 1) If $x = \frac{\sqrt{a^2 - b}}{c^2}$, and $a = 12$, $b = -36$ and $c = 4.2$, find x to 3 sf.

- 2) If $x = 7$, $y = -4$ and $z = -3$, find the values of

(a) $x^2 - y^2$ (b) yz^2 (c) $\frac{x-2y}{z}$

Multiplying brackets, solving equations

3) Solve: (a) $4(3x - 5) - (2x - 10) = 6(x - 3)$ (b) $\frac{4}{2x+3} = \frac{10}{8x+3}$

4) Simplify: (a) $(2x - 5y)(3x + 4y)$ (b) $(4x + 5)(4x - 5)$ (c) $(2x - 3)^2$

Simultaneous Equations

5) Solve: $4x - 3y = 15$
 $6x - 5y = 24$

Factorising

- 6) Factorise:

(a) $18x^2y - 12xyz$ (b) $4x^2 - 16x$ (c) $4x^2 - 16$ (d) $25x^2 - 81y^2$

- 7) Factorise:

(a) $x^2 + 10x + 24$ (b) $x^2 + 10x - 24$ (c) $x^2 - 10x + 24$ (d) $x^2 - 10x - 24$

- 8) Factorise:

(a) $2x^2 + x - 15$ (b) $6x^2 - 11x + 4$

Solving Quadratic Equations

9) Solve: (a) $x^2 = 7x + 18$ (b) $3x^2 + 12 = 15x$

10) Solve, giving your answers to 3 significant figures: $5x^2 = 3x + 13$

Problems solved by equations

- 11) The total of Tom's parents ages is 80. Tom's grandmother is three times as old as his mother, and twice as old as his father. If Tom's mother is x years old, write down an expression for Tom's father's age. Hence write down two different expressions for Tom's grandmother's age. Solve an equation to find their ages.

- 12) The length of a rectangle is 1cm more than the width. The diagonal of the rectangle is 29cm. Find the length and width.

- 13) For £6.60 I can either buy 3 Chocos and 5 Twizzlers, or 4 Chocos and 3 Twizzlers. Form two equations, and solve them simultaneously to find the cost of each type of sweet.