



A Level Mathematics

Get Ready

GCSE Skills Revision

Name _____

This Booklet is Essential Preparation for your Course

Task:

Please complete the following questions and **bring to your first session of A Level Mathematics.**

Be prepared to hand in your solutions, showing your working. Please also write the section headings on your work to indicate which questions you are working on.

A Level Mathematics is far more challenging than your GCSE Mathematics course. Most of the course relies on advanced algebra and so your algebra skills from GCSE need to be strong; they are the foundation upon which we will be building right from the start.

We have provided you with this preparation booklet as we want you to be able to meet these challenges in September. If you can complete most of the questions set over the next few pages correctly you will be well prepared for the start of your course. If you are finding them difficult, or feel that you need further practice, try refreshing your memory by looking at any GCSE higher textbook, revision guide or online resources such as www.corbettmaths.com or www.examsolutions.net/gcse-maths

Every question in this booklet is non calculator.



Enjoy your summer. We are looking forward to seeing you in September.

Revision booklet

Do all of these questions before you start the A level course.

You may choose to use a separate piece of paper or to write in this booklet.



Indices

Q1 Write in the form 2^n

1) $2^5 \times 2^3$

2) 2×2^6

3) 1

4) $2^6 \div 2^2$

5) $2^5 \div 2$

6) $(2^7)^2$

Q2 Simplify

1) $2p^2 \times 4p^5$

2) $x^2 \times x^3 \times x^5$

3) $12x^7 \div 2x^2$

4) $(x^3)^4$

5) $x^5 \div x^5$

Q3 Evaluate without a calculator



1) $64^{\frac{1}{3}}$

2) $25^{\frac{1}{2}}$

3) $9^{\frac{1}{2}}$

4) $32^{\frac{1}{5}}$

5) $125^{\frac{1}{3}}$

Q4 Evaluate without a calculator, leaving answers as fractions

1) 3^{-1}

2) 2^{-3}

3) 3^{-2}

4) 6^{-2}

5) 4^{-3}

Q5 Evaluate without a calculator, leaving answers as fractions

1) $9^{-\frac{1}{2}}$

2) $64^{-\frac{1}{2}}$

3) $64^{-\frac{1}{3}}$

4) $81^{-\frac{1}{4}}$

5) $125^{-\frac{1}{3}}$

Q6 Evaluate without a calculator

1) $4^{\frac{3}{2}}$

2) $27^{\frac{2}{3}}$

3) $9^{\frac{3}{2}}$

4) $16^{\frac{3}{2}}$

5) $8^{\frac{2}{3}}$

Q1 Write in the form x^n

1) \sqrt{x}

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

3) $\frac{1}{x^3}$

4) $\frac{3}{\sqrt{x}}$

5) $\sqrt[3]{x}$

6) $\frac{5}{\sqrt[3]{x}}$

7) $\sqrt{x^5}$

8) $\frac{x^6}{x^3}$

Algebraic Expressions

Q1 Expand and simplify

1) $5a + 3(a + 4)$

2) $7(y + 2) - 3(y + 1)$

3) $4(k - 4) - 6(2k + 7)$

Q2 Expand and simplify

1) $(2y + 2)(y + 6)$

2) $(5c - 7)(2c + 3)$

3) $(y - 5)^2$

Q3 Factorise fully

1) $2x^3 - 4x^2$

2) $x^2y^2 - 6xy$

3) $xy - 4x^2$

4) $2x^2y^2 + 6x^2y$



Q4 Factorise

1) $2x^2 + 5x + 3$

2) $2x^2 + 7x + 5$

3) $2x^2 - 9x + 7$

4) $2x^2 - 13x + 15$

5) $2x^2 + 5x - 18$

6) $4x^2 + 16x + 15$

7) $6x^2 + 17x + 12$

8) $6x^2 + x - 12$

Q5 Factorise

1) $x^2 - 1$

2) $x^2 - 25$

3) $4x^2 - 49$

4) $100 - 9x^2$

5) $a^2 - b^2$

Q6 Write these expressions in the form $(x \pm a)^2 \pm b$. This is also known as completing the square.

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

2) $x^2 + 14x - 5$

3) $x^2 - 6x + 3$

4) $x^2 + 5x + 1$

5) $2x^2 + 8x + 1$

6) $2x^2 - 6x + 7$

Solving Linear Equations

Q1 Solve

1) $6x + 12 = 48$

2) $9 - 2x = 17$

3) $6 + \frac{x}{4} = 9$

4) $8 = 3 - \frac{x}{2}$

Q2 Solve

1) $3x = 12 + x$

2) $2x - 27 = 5x$

3) $4x - 6 = 8 - 3x$

4) $2x + 9 = 3 - x$

Q3 Solve, leaving answers as fractions as appropriate

1) $\frac{2x}{3} + 1 = 5$

2) $\frac{5(x-4)}{9} = 10$



$$3) \frac{2x+4}{5} = x$$

$$4) \frac{x-2}{3} = \frac{x}{5}$$

Q4 Solve the simultaneous equations, leaving answers as fractions as appropriate

$$1) \begin{aligned} 4x - 5y &= 5 \\ 2x - 3y &= 2 \end{aligned}$$

$$2) \begin{aligned} 6x - 2y &= 9 \\ 3x + 4y &= 12 \end{aligned}$$

$$3) \begin{aligned} 6x - 5y &= -7 \\ 3x + 4y &= 16 \end{aligned}$$

Fractions

Q1 Evaluate and simplify **without a calculator**

$$1) \frac{2}{3} \times \frac{4}{5}$$

$$2) \frac{2}{5} \times \frac{2}{3}$$

$$3) \frac{2}{3} \times 15$$

$$4) \frac{2}{7} \div \frac{3}{8}$$

$$5) \frac{5}{6} \div \frac{1}{2}$$

$$6) 9 \div \frac{3}{4}$$

Q2 Evaluate and simplify **without a calculator**

$$1) \frac{2}{3} + \frac{4}{5}$$

$$2) \frac{2}{5} - \frac{2}{3}$$

$$3) \frac{2}{9} + \frac{1}{3}$$

$$4) \frac{5}{6} - \frac{3}{8}$$

Q3 Simplify

$$1) \frac{x}{3} + \frac{x}{2}$$

$$2) \frac{4x}{5} - \frac{x}{2}$$

$$3) \frac{5}{x+1} + \frac{4}{x-3}$$

$$4) \frac{4}{y+1} - \frac{5}{y+2}$$

Q4 Simplify

$$1) \frac{x}{3} \times \frac{x}{2}$$

$$2) \frac{4x}{5} \div \frac{x}{2}$$

$$3) \frac{4x}{3y} \div \frac{x}{2y}$$

$$4) \frac{4}{y+1} \times \frac{5}{y+2}$$



Inequalities

Q1 Solve

1) $3x - 10 < 29$

2) $\frac{x}{4} + 10 \geq 13$

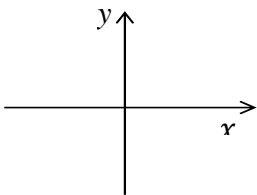
3) $2 - 3x \leq 20$

4) $9x + 1 < 2x + 22$

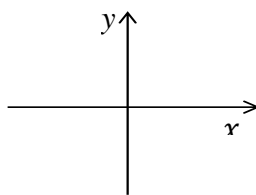
Graphs

Sketch the following graphs

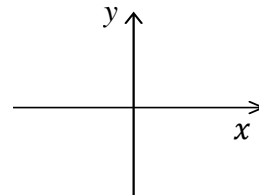
1) $y = x^2$



2) $y = x^3$



3) $y = \frac{1}{x}$



Equations of Straight Lines

Q1 State the gradient and y-intercept of the following lines. You may have to rearrange them first into the form $y = mx + c$.

1) $y = 2x - 3$

2) $y = 5 - 4x$

3) $3x - 2 - y = 0$

4) $4x - 3 - 2y = 0$

Q2 Find the gradient of the line through each pair of points.

1) (3, 4) and (5, 10)

2) (3, 5) and (5, 1)

3) (-1, 8) and (1, 2)

4) (3, -2) and (15, 2)

Q3 Find the midpoint of each pair of points.

1) (4, 7) and (6, 11)

2) (-3, 4) and (5, 8)

3) (1, 0) and (7, 5)

4) (-7, -5) and (4, 8)



Q4 Find the equation of the straight line passing through the given point and with the stated gradient:

1) Through (2,1) with gradient 3

2) Through (-2,3) with gradient 5

3) Through (3, - 7) with gradient -4

4) Through (-6 , - 1) with gradient $-\frac{2}{3}$

5) Through (3, 5) with gradient perpendicular to 7

6) Through (-3, -7) with gradient perpendicular to $\frac{-7}{12}$

Solving Quadratic Equations

Q1 Solve

1) $(x + 3)(x - 7) = 0$

2) $(2x - 3)(4x + 5) = 0$

3) $(3x + 1)^2 = 0$

4) $(3-x)(x - 5) = 0$

Q2 Solve these equations by factorising.

1) $x^2 + 5x + 4 = 0$

2) $x^2 + 7x + 12 = 0$

3) $4x^2 - 6x = 0$

Q3 Solve these equations by using the quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ You don't need a calculator.

1) $5x^2 + 7x + 2 = 0$

2) $2x^2 - 9x + 7 = 0$

