Wyggeston & Queen Elizabeth I College

Mathematics A-level

This double-sided A4 sheet contains questions which we expect you to do before coming to your first Mathematics lesson.

You **MUST** show all your working, and you are **not allowed to use a calculator**!

You will be awarded marks for **presentation**, so make sure you write out your solutions on **A4 lined** or **squared paper**, **underline** your answers, and write your **name** and **student** number on your work. This work will be collected in at the beginning of your first Further Mathematics lesson.

If you forgotten how to answer these questions please use this link to the AMSP which has resources to help you Transition to A level Mathematics: Essential Skills - AMSP

Algebra skills are essential if you are to be successful with A level maths

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1. Simplify these expressions.

a $\dfrac{x^3 \times x^4}{x^2}$ **(1 mark)**

b $(2x^3)^4$ **(1 mark)**

c $\dfrac{9x^{\frac{1}{2}}}{(27x^{-2})^{\frac{2}{3}}}$ **(3 marks)**

2 Solve $2x^2 \times 4x^4 = 512$ **(2 marks)**

3 Find the value of *x*.

$$x^{-\frac{4}{3}} = \frac{1}{256}$$ **(2 marks)**

4 **a** Write $\sqrt{240}$ in the form $a\sqrt{15}$, where *a* is an integer. **(1 mark)**

b Expand and simplify $(2-\sqrt{3})(5+2\sqrt{3})$. **(2 marks)**

c Simplify $\dfrac{2+\sqrt{5}}{3-\sqrt{5}}$ giving your answer in the form $a+b\sqrt{c}$, where *a*, *b* and *c* are rational numbers. **(3 marks)**

5 The area of a triangle is given as $(7+3\sqrt{3})$ cm^2.

The base of the triangle is $(5-\sqrt{3})$ cm, and the perpendicular height is $(p+q\sqrt{3})$ cm. Find the values of *p* and *q*. **(4 marks)**

6 Expand and simplify these expressions.

a $3(x-2y)$ **(1 mark)**

b $(2x-3)(3x+5)$ **(2 marks)**

c $(x-2)^2(x+5)$ **(3 marks)**

7 Fully factorise these expressions.

a $2xy-4x$ **(1 mark)**

b x^2+2x-3 **(1 mark)**

8 Solve these equations.

a $3x-7=17$ **(1 mark)**

b $x^2-6x+5=0$ **(2 marks)**

c $2x^2-5x+1=0$ **(2 marks)**

9 Solve these pairs of simultaneous equations.

a $2x+y=7$
$3x-y=8$ **(3 marks)**

b $2x-y=9$
$x^2+y^2=17$ **(4 marks)**

10 Solve these inequalities.

a $7x-6 \leqslant 8$ **(1 mark)**

b $3x+2 \geqslant 7x-4$ **(2 marks)**

c $x^2+12x-28>0$ **(2 marks)**