



# A Level Mathematics

## Summer bridging work

We hope you are looking forward to starting A Level Mathematics in September.

Please complete the questions below. To help you you may need to complete the free course on the Advanced Maths Support Programme website

<https://mymei.powerappsportals.com/Learner-Transition-to-A-Levels-and-Core-Maths-Skills>.

You will need to create a free account first.

### Task

1) Simplify these expressions.

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

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

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

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

3) Find the value of  $x$ .

$$x^{-\frac{1}{3}} = \frac{1}{256}$$

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  $\frac{2 + \sqrt{5}}{3 - \sqrt{5}}$  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  $(7 + 3\sqrt{3}) \text{ cm}^2$ .

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 equations.**

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)  $2x + y = 7$

(3 marks)

$3x - y = 8$

b)  $y = 3x - 1$

(3 marks)

$3y = 6x + 1$

c)  $2x - y = 9$

(4 marks)

$x^2 + y^2 = 17$

10) **Solve these inequalities.**

a)  $7x - 6 \leq 8$

(1 mark)

b)  $3x + 2 \geq 7x - 4$

(2 marks)

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

(2 marks)

11) **The function f is defined as  $f(x) = 5x + 2$**

**Find the value of  $f(-4)$ .**

(1 mark)