

# Year 12 AS/A level Maths Baseline Test

## Instructions

- The time for the test is 1 hour.
- Answer **all** questions.

## Information

- The total mark for this paper is 48.
- The marks for each question are shown in brackets  
*-use this as a guide as to how much time to spend on each question.*

## Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**1** Simplify these expressions.

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

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

**c**  $\frac{9x^{\frac{1}{2}}}{(27x^{-2})^{\frac{2}{3}}}$  (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  $\frac{2 + \sqrt{5}}{3 - \sqrt{5}}$  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  $(5 - \sqrt{3}) \text{ cm}$ , and the perpendicular height is  $(p + q\sqrt{3}) \text{ cm}$ .

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**  $2x + y = 7$  (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)

**This is the end of the test.**