

Write your name here

Surname

Other names

In the style of:

**Edexcel GCSE**

Centre Number

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Candidate Number

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# Mathematics A

## Surds and Indices

**Higher Tier**

Past Paper Style Questions  
Arranged by Topic

Paper Reference

**1MA0/1H**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- **Calculators must not be used.**



### Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (\*) are ones where the quality of your written communication will be assessed.

### 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.

Turn over ►

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1. Work out  $(2+\sqrt{5})(2-\sqrt{5})$

Give your answer in its simplest form.

$$4 - 2\sqrt{5} + 2\sqrt{5} - \sqrt{5}\sqrt{5}$$
$$= 4 - 5 = -1$$

N.B:  $\sqrt{a} \cdot \sqrt{a} = a$

$-1$   
.....

2. (a) Write down the value of  $64^{\frac{1}{2}}$

$a^{\frac{1}{n}} = \sqrt[n]{a}$ .  $64^{\frac{1}{2}} = \sqrt{64} = 8$

$8$   
.....  
(1)

(N.B:  $\sqrt[3]{64}$  just means  $\sqrt{64}$ )

(b) Write  $\sqrt{45}$  in the form  $k\sqrt{5}$ , where  $k$  is an integer.

$$\sqrt{45} \equiv \sqrt{9 \times 5} = \sqrt{9} \times \sqrt{5}$$
$$= 3\sqrt{5}$$

$3\sqrt{5}$   
.....  
(1)

N.B:  $\sqrt{a \times b} \equiv \sqrt{a} \times \sqrt{b}$

(Total 2 marks)



3. Find the value of

(i)  $8^0$

N.B:  $a^0 = 1, a \neq 0$

(ii)  $64^{\frac{1}{2}}$

1

8

(iii)  $\left(\frac{27}{8}\right)^{\frac{2}{3}}$

$$\frac{27^{2/3}}{8^{2/3}} = \frac{(\sqrt[3]{27})^2}{(\sqrt[3]{8})^2}$$

$2\frac{1}{4}$

(Total 4 marks)

$$= \frac{3^2}{2^2} = \frac{9}{4} = 2\frac{1}{4}$$

N.B:  $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

and  $a^{m/n} = (\sqrt[n]{a})^m$



4. (a) Simplify  $4x \times 5y$

$$\frac{20xy}{\dots\dots\dots} \quad (1)$$

(b) Simplify  $x \times x \times x \times x$

$$\frac{x^4}{\dots\dots\dots} \quad (1)$$

(c) Expand  $4(3n-7)$

$$\frac{12n - 28}{\dots\dots\dots} \quad (2)$$

(d) Expand and simplify  $2(2x+3)+3(x+1)$

$$4x + 6 + 3x + 3 \\ = 7x + 9$$

$$\frac{7x + 9}{\dots\dots\dots} \quad (2)$$

(e) Simplify  $n^2 \times n$

$$\frac{n^3}{\dots\dots\dots} \quad (1)$$

(f) Simplify  $p^5 \div p^3$   $p^{(5-3)} = p^2$

N.B:  $a^m \div a^n = a^{(m-n)}$

$$\frac{p^2}{\dots\dots\dots} \quad (1)$$

(Total 8 marks)



5. (a) Simplify  $q^5 \times q^4$

$$q^{(5+4)} = q^9$$

N.B:  $a^m \times a^n = a^{(m+n)}$

$$\frac{q^9}{\dots\dots\dots} \quad (1)$$

(b) Simplify  $r^5 \div r^2$

$$\frac{r^3}{\dots\dots\dots} \quad (1)$$

(c) Simplify  $12t^6 \div 6t^5$

$$\frac{2t}{\dots\dots\dots} \quad (2)$$

(d) Simplify  $(9w^2y^6)^{\frac{1}{2}}$

$$9^{\frac{1}{2}} (w^2)^{\frac{1}{2}} (y^6)^{\frac{1}{2}} = 3wy^3$$

N.B:  $(ax)^n = a^n x^n$

and  $(a^m)^n = a^{(m \times n)}$

$$\frac{3wy^3}{\dots\dots\dots} \quad (2)$$

(e) For  $y > 1$ , write the following expressions in order of size. Start with the expression with the least value.

$$y^0 \quad y^2 \quad y \quad y^{-2} \quad y^{\frac{1}{2}}$$

$$\frac{y^{-2}, y^0, y^{\frac{1}{2}}, y, y^2}{\dots\dots\dots}$$

Try a specific instance of  $y > 1$  such as  $y = 4$  and then sort into ascending order (Total 8 marks) (2)

as follows :

$f(y)$	$f(4)$ , i.e. the value for $f(y)$ when $y = 4$
$y^{-2}$	$4^{-2} = \frac{1}{4^2} = \frac{1}{16}$ (N.B: $a^{-n} = \frac{1}{a^n}$ )
$y^0$	$4^0 = 1$
$y^{1/2}$	$4^{1/2} = 2$
$y$	$4^1 = 4$ (N.B: $a^1 \equiv a$ )
$y^2$	$4^2 = 16$

