Write your name here

Surname	Other names

In the style of:

Edexcel GCSE

Centre Number	Candidate Number

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 ▶

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

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

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

8

(1)

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

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

$= 3\sqrt{5}$

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

$3\sqrt{5}$

(1)

(Total 2 marks)

3. Find the value of

(i) 8^0

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

1

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

8

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

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

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

$2\frac{1}{4}$

(Total 4 marks)

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

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

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

$20xy$

(1)

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

x^4

(1)

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

$12n - 28$

(2)

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

$4x + 6 + 3x + 3$

$= 7x + 9$

$7x + 9$

(2)

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

n^3

(1)

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

p^2

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

(1)

(Total 8 marks)

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

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

q^9

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

(1)

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

r^3

(1)

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

$2v$

(2)

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

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

$= 3wy^3$

$3wy^3$

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

(2)

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

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

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

Try a specific instance of $y > 1$ such as $y = 4$ and then sort into ascending order as follows:

(2)

(Total 8 marks)

$f(y)$	$f(4)$, 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	$4^2 = 16$

6. (a) Simplify $n^3 \times n^4$

n^7

(1)

(b) Simplify $q^7 \div q^3$

q^4

(1)

(c) Simplify $a^2b^3 \times 3ab^2$

$3a^3b^5$

(2)

(Total 4 marks)

7. (a) Expand and simplify $3(a + 4) + 5(2a + 1)$

$3a + 12 + 10a + 5$

$= 13a + 17$

$13a + 17$

(2)

(b) Simplify $x^4 \times x^6$

x^{10}

(1)

(c) Simplify $y^8 \div y^5$

y^3

(1)

(d) Simplify $(z^4)^3$

$z^{(4 \times 3)} = z^{12}$

z^{12}

(1)

(Total 5 marks)

8. (a) Simplify $v^6 \times v^2$

v^8

(1)

(b) Simplify $\frac{m^8}{m^3}$

m^5

(1)

(c) Simplify $(2y)^3$

$2^3 y^3 = 8y^3$

$8y^3$

(2)

(d) Simplify $3a^2h \times 4a^5h^4$

$12a^7h^5$

(2)

(Total 6 marks)

BLANK PAGE