| Name ANSWERS | Class |
|---|---|

MATHS TEACHER HUB

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# Indices

## (9 – 1) Topic booklet

# Foundation

**These questions have been collated from previous years GCSE Mathematics papers.**

| **You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. | 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.*
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- If the question is a **1F** question you are not allowed to use a calculator.
- If the question is a **2F** or a **3F** question, you may use a calculator to help you answer.

## Information

- 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.

**Answer ALL questions**
**Write your answers in the space provided.**
**You must write down all the stages in your working.**

**7** Simplify $d^2 \times d^3$

$d^5$

(1)

Specimen 1 – Paper 3F

**(Total for Question 7 is 1 mark )**

**16** Simplify $(m^3)^2$

$m^6$

(1)

Specimen 1 – Paper 2F

**(Total for Question 16 is 1 mark )**

**17** Simplify $4e^2f \times 5ef^3$

$20e^3f^4$

(2)

November 2021 – Paper 3F

**(Total for Question 17 is 2 marks)**

**18** Write down the value of $10^0$

1

May 2024 – Paper 1F

**(Total for Question 18 is 1 mark)**

**19** (a) (i) Write down the value of $5^0$

1

(1)

(ii) Write down the value of $5^{-2}$

$\frac{1}{5^2} = \frac{1}{25}$

(1)

(b) Write $\frac{2^5 \times 2^4}{2^3}$ in the form $2^n$ where $n$ is an integer.

$\frac{2^9}{2^3} = 2^6$

$2^6$

(2)

November 2023 – Paper 1F

**(Total for Question 19 is 4 marks)**

**19** (a) Simplify $(t^3)^2$

$t^6$

(1)

(b) Simplify $\frac{w^9}{w^4}$

$w^5$

(1)

Specimen 2 – Paper 1F

**(Total for Question 19 is 2 marks)**

**20** (a) Simplify $(m^2)^3$

$m^6$

(1)

(b) Simplify $x^5 \times x^8$

$x^{13}$

(1)

(c) Expand $4p(p^2 + 3p)$

$4p^3 + 12p^2$

(2)



**(Total for Question 20 is 4 marks)**

**20** (a) Simplify $c^5 \div c^2$

$c^3$

(1)

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

$d^{12}$

(1)

November 2021 – Paper 1F **(Total for Question 20 is 2 marks)**

**20** Work out the value of $\dfrac{3^7 \times 3^{-2}}{3^3}$ $= \dfrac{3^5}{3^3} = 3^2$

9

November 2018 – Paper 1F **(Total for Question 20 is 2 marks)**

**20** (a) Simplify $m^3 \times m^4$

$m^7$

(1)

(b) Simplify $(5np^3)^3$

$125n^3p^9$

(2)

(c) Simplify $\dfrac{32q^9r^4}{4q^3r}$

$8q^6r^3$

(2)

May 2018 – Paper 2F

**(Total for Question 20 is 5 marks)**

**21** Simplify $(2^{-5} \times 2^8)^2$

Give your answer as a power of 2

$(2^3)^2 = 2^6$

$2^6$

November 2022 – 1F

**(Total for Question 21 is 2 marks)**

**21** (a) Simplify $(x^3)^5$

$x^{15}$

(1)

June 2022 – Paper 2F **(Total for Question 21 is 1 mark )**

**21** $p^3 \times p^x = p^9$

(a) Find the value of $x$.

$x =$ 6

(1)

$(7^2)^y = 7^{10}$

(b) Find the value of $y$.

$y =$ 5

(1)

$100^a \times 1000^b$ can be written in the form $10^w$

(c) Show that $w = 2a + 3b$

$100 = 10^2$

$1000 = 10^3$

$(10^2)^a \times (10^3)^b = 10^w$

$10^{2a} \times 10^{3b} = 10^w$

$10^{2a+3b} = 10^w$

$2a+3b = w$

(2)

November 2017 – Paper 2F **(Total for Question 21 is 4 marks)**

**23** (a) Simplify $n^3 \times n^5$

$n^8$

(1)

(b) Simplify $\dfrac{c^3d^4}{c^2d}$

$cd^3$

(2)

May 2020 – Paper 3F **(Total for Question 23 is 3 marks)**

**24** Simplify $5u^2w^4 \times 7uw^3$

$35u^3w^7$

(2)

Specimen 2 – Paper 2F **(Total for Question 24 is 2 marks)**

**26** (a) Simplify $(p^2)^5$

$p^{10}$

(1)

(b) Simplify $12x^7y^3 \div 6x^3y$

$2x^4y^2$

(2)

November 2019 – Paper 1F **(Total for Question 26 is 3 marks)**

**29** Work out the value of $\frac{4^{-6} \times 4^9}{4}$ $= \frac{4^3}{4} = 4^2$

16

June 2023 – Paper 1F **(Total for Question 29 is 2 marks)**

**30** Simplify $(m^{-2})^{-3}$

$m^6$

(1)



**(Total for Question 30 is 1 mark )**