

Name

Class

MATHS TEACHER HUB

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Fractions

(9 – 1) Topic booklet

Model questions

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.

1 $\frac{2}{7} + \boxed{\frac{5}{7}} = 1$

(1)

November 2018 – Paper 3F

(Total for Question 1 is 1 mark)

2 Write a fraction in the box to make the calculation correct.

$1 - \frac{3}{10} = \boxed{\frac{7}{10}}$

June 2022 – Paper 2F

(Total for Question 2 is 1 mark)

4 Write the fraction $\frac{28}{70}$ in its simplest form.

$$\frac{28}{70} = \frac{14}{35} = \frac{2}{5}$$

$$\frac{2}{5}$$

November 2019 – Paper 1F

(Total for Question 4 is 1 mark)

4 Here is a list of four fractions.

$$\frac{4}{16} = \frac{1}{4} \quad \frac{2}{8} = \frac{1}{4} \quad \frac{15}{60} = \frac{1}{4} \quad \frac{3}{9} = \frac{1}{3}$$

One of these fractions is **not** equivalent to $\frac{1}{4}$

Write down this fraction.

$$\frac{3}{9}$$

May 2018 – Paper 1F

(Total for Question 4 is 1 mark)

- 7 Harry has 20 sweets.
He gives 7 of the sweets to Nadia.

What fraction of the 20 sweets does Harry have now?

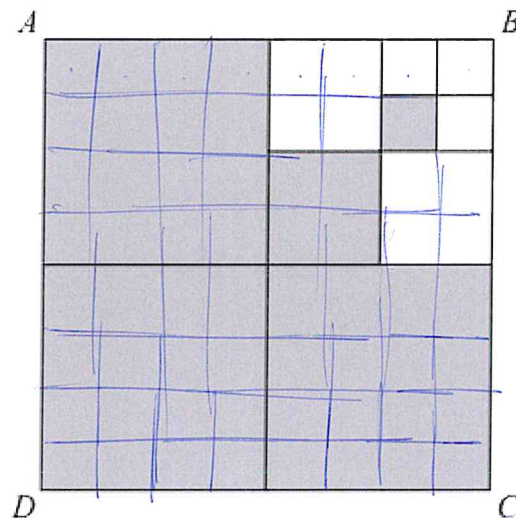
$$\begin{array}{r} 20 \\ - 7 \\ \hline 13 \end{array}$$

$$\frac{13}{20}$$

November 2019 – Paper 2F

(Total for Question 7 is 2 marks)

- 7 $ABCD$ is a square.
This diagram is drawn accurately.



What fraction of the square $ABCD$ is shaded?

$$\frac{48}{64} + \frac{4}{64} + \frac{1}{64} = \frac{53}{64}$$

$$\left[\text{alt: } \frac{3}{4} + \frac{1}{16} + \frac{1}{64} \right]$$

Sample 1 – Paper 2F

(Total for Question 7 is 2 marks)

8 (a) Work out $\frac{5}{8} \times \frac{3}{4} = \frac{15}{32}$

(1)

(b) Work out $\frac{2}{3} - \frac{1}{4}$

$$\frac{8}{12} - \frac{3}{12} = \frac{5}{12}$$

(2)

June 2017 – Paper 1F

(Total for Question 8 is 3 marks)

9 Here are five fractions.

$$\frac{2}{8} = \frac{1}{4} \quad \frac{10}{40} = \frac{1}{4} \quad \frac{12}{48} = \frac{1}{4} \quad \frac{5}{24} \quad \frac{20}{80} = \frac{1}{4}$$

One of these fractions is **not** equivalent to $\frac{1}{4}$

(a) Write down this fraction.

$$\frac{5}{24}$$

(1)

(b) Work out $\frac{2}{7} + \frac{1}{14}$

$$\frac{4}{14} + \frac{1}{14} = \frac{5}{14}$$

(2)

(c) Work out $\frac{4}{5} \div \frac{3}{10}$

Give your answer in its simplest form.

~~8~~

$$\frac{4}{5} \times \frac{10}{3} = \frac{40}{15} = 2 \frac{10}{15} = 2 \frac{2}{3}$$

alt

$$\frac{4}{5} \times \frac{10}{3} = \frac{8}{3} = 2 \frac{2}{3}$$

(2)

Specimen 2 – Paper 1F

(Total for Question 9 is 5 marks)

11 Here are some fractions.

$$\frac{9}{12} = \frac{3}{4} \quad \frac{6}{8} = \frac{3}{4} \quad \frac{18}{24} = \frac{9}{12} = \frac{3}{4} \quad \frac{10}{16} = \frac{5}{8} \quad \frac{15}{20} = \frac{3}{4}$$

One of these fractions is **not** equivalent to $\frac{3}{4}$

(a) Which fraction?

$$\frac{10}{16}$$

.....
(1)

(b) Work out $\frac{1}{12} + \frac{5}{6}$

$$\frac{1}{12} + \frac{10}{12} = \frac{11}{12}$$

.....
(2)

12 (a) Work out $\frac{5}{12} + \frac{1}{6}$

$$\frac{5}{12} + \frac{2}{12} = \frac{7}{12}$$

(2)

(b) Work out $\frac{3}{10} \times \frac{5}{8}$

Give your answer as a fraction in its simplest form.

$$= \frac{3}{10} \times \frac{5}{8} = \frac{15}{80} = \frac{3}{16}$$

(Handwritten red annotations: a red arrow points from 15 to 3 with "÷5" above it, and another red arrow points from 80 to 16 with "÷5" below it.)

$$\text{alt: } \frac{3}{\cancel{10}_2} \times \frac{\overset{1}{\cancel{5}}}{8} = \frac{3}{16}$$

(2)

12 Find the number that is exactly halfway between $\frac{1}{10}$ and $\frac{3}{5}$

$$\frac{1}{10} \quad \text{to} \quad \frac{6}{10}$$

$$\frac{1+6}{2} = \frac{7}{2} = 3\frac{1}{2}$$

$$\frac{3\frac{1}{2}}{10} = \frac{7}{20}$$

November 2019 – Paper 2F

(Total for Question 12 is 2 marks)

15 Work out $\frac{6}{7} \times \frac{5}{12} = \frac{30}{84} = \frac{15}{42} = \frac{5}{14}$

Give your answer as a fraction in its simplest form.

alt $\frac{\cancel{6}^1}{7} \times \frac{5}{\cancel{12}_2} = \frac{5}{14}$

June 2023 – Paper 1F

(Total for Question 15 is 2 marks)

18 (a) Work out $\frac{2}{7} + \frac{1}{5}$

$$\frac{10}{35} = \frac{2}{7}$$

$$\frac{1}{5} = \frac{7}{35}$$

$$\frac{10}{35} + \frac{7}{35} = \frac{17}{35}$$

(2)

(b) Work out $1\frac{2}{3} \div \frac{3}{4}$

$$\frac{5}{3} \times \frac{4}{3} = \frac{20}{9} = 2\frac{2}{9}$$

(2)

19 Lethna worked out $\frac{2}{5} + \frac{1}{2}$

She wrote:

$$\frac{2}{5} + \frac{1}{2} = \frac{2}{10} + \frac{1}{10} = \frac{3}{10}$$

The answer of $\frac{3}{10}$ is wrong.

(a) Describe one mistake that Lethna made.

$$\frac{2}{5} = \frac{4}{10}, \text{ not } \frac{2}{10} \quad \& \quad \frac{1}{2} = \frac{5}{10}$$

it should be $\frac{4}{10} + \frac{5}{10} = \frac{9}{10}$. (1)

Dave worked out $1\frac{1}{2} \times 5\frac{1}{3}$

He wrote:

$$1 \times 5 = 5 \quad \text{and} \quad \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$$

$$\text{so } 1\frac{1}{2} \times 5\frac{1}{3} = 5\frac{1}{6}$$

The answer of $5\frac{1}{6}$ is wrong.

he needs to work with improper fractions.

(b) Describe one mistake that Dave made.

$$1\frac{1}{2} = \frac{3}{2} \quad 5\frac{1}{3} = \frac{16}{3}$$

$$\frac{3}{2} \times \frac{16}{3} = 8$$

19 (a) Work out $\frac{2}{3} - \frac{1}{5}$

$$\frac{10}{15} - \frac{3}{15} = \frac{7}{15}$$

.....
(2)

(b) Work out $\frac{2}{3} \times \frac{3}{4} = \frac{6}{12} = \frac{1}{2}$

Give your answer as a fraction in its simplest form.

.....
(2)

19 (a) Work out $2\frac{1}{7} + 1\frac{1}{4}$

$$3\frac{4}{28} + \frac{7}{28}$$

$$3\frac{11}{28}$$

(2)

(b) Work out $1\frac{1}{5} \div \frac{3}{4}$

Give your answer as a mixed number in its simplest form.

$$\begin{aligned} & 1\frac{1}{5} \div \frac{3}{4} \\ &= \frac{6}{5} \times \frac{4}{3} = \frac{24}{15} = \frac{8}{5} = 1\frac{3}{5} \end{aligned}$$

(2)

20 (a) Work out $1\frac{3}{5} + 2\frac{1}{4}$

Give your answer as a mixed number.

$$3\frac{12}{20} + \frac{5}{20}$$
$$= 3\frac{17}{20}$$

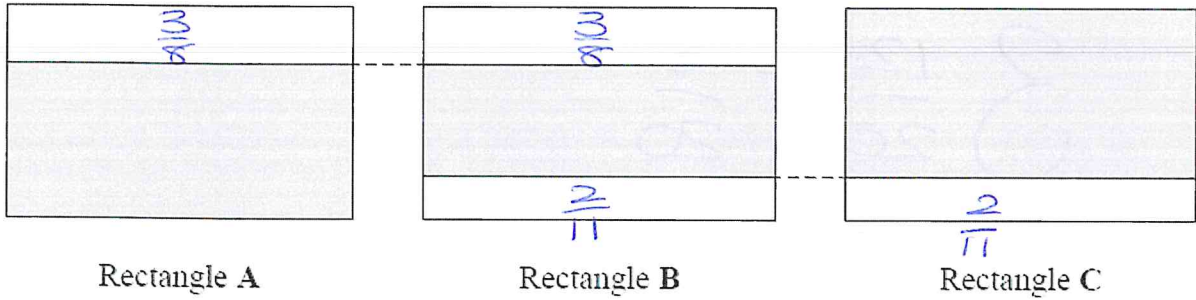
(2)

(b) Show that $2\frac{2}{3} \div 6 = \frac{4}{9}$

$$\frac{8}{3} \div 6$$
$$= \frac{8}{3} \times \frac{1}{6} = \frac{8}{18} = \frac{4}{9}$$

(2)

20 The diagram shows three identical rectangles A, B and C.



$\frac{5}{8}$ of rectangle A is shaded.

$\frac{9}{11}$ of rectangle C is shaded.

Work out the fraction of rectangle B that is shaded.

$$B = 1 - \left[\frac{5}{8} + \frac{2}{11} \right]$$

$$= 1 - \left[\frac{33}{88} + \frac{16}{88} \right]$$

$$= 1 - \frac{49}{88}$$

$$= \frac{39}{88}$$

ALT:

$$\frac{5}{8} + \frac{9}{11}$$

$$= \frac{55}{88} + \frac{72}{88} = \frac{127}{88}$$

$$= \frac{39}{88}$$

$$\therefore B = \frac{39}{88}$$

21 Show that

$$2\frac{1}{3} \times 3\frac{3}{4} = 8\frac{3}{4}$$

$$\begin{aligned} \frac{7}{\cancel{3}} \times \frac{1\cancel{8}^5}{4} &= \frac{35}{4} \\ &= 8\frac{3}{4} \end{aligned}$$

May 2020 – Paper 1F

(Total for Question 21 is 3 marks)

22 Work out $4\frac{1}{5} - 2\frac{2}{3}$

Give your answer as a mixed number.

$$\begin{aligned} 4 - 2 &= 2 & \frac{1}{5} - \frac{2}{3} \\ & & = \frac{3}{15} - \frac{10}{15} \\ & & = -\frac{7}{15} \end{aligned}$$

$$\begin{aligned} 2 - \frac{7}{15} \\ = 1\frac{8}{15} \end{aligned}$$

ALT.

$$\begin{aligned} \frac{21}{5} - \frac{14}{3} \\ = \frac{63}{15} - \frac{40}{15} \\ = \frac{23}{15} \\ = 1\frac{8}{15} \end{aligned}$$

November 2021 – Paper 1F

(Total for Question 22 is 3 marks)

22 Work out $1\frac{3}{4} \times 1\frac{1}{3}$

Give your answer as a mixed number.

$$\begin{aligned} \frac{7}{4} \times \frac{4}{3} &= \frac{7}{3} \\ &= 2\frac{1}{3} \end{aligned}$$

22 (a) Work out $\frac{2}{5} + \frac{1}{4}$

$$= \frac{8}{20} + \frac{5}{20}$$

$$= \frac{13}{20}$$

(2)

November 2017 – Paper 1F

(Total for Question 22 is 2 marks)