

Fractions (F)

A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

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Total Marks:	

1. Find $\frac{1}{4}$ of 16.

4 [1]

2. Emma has done some calculations.

Explain how you know the answer is wrong without working out the correct answer.

$$\frac{3}{4} + \frac{2}{3} = \frac{5}{7}$$

$\frac{3}{4}$ and $\frac{2}{3}$ are both greater than $\frac{1}{2}$ so the answer will be greater than 1. [1]

3. In a box of 12 eggs, 5 are cracked.

What fraction is cracked?

$\frac{5}{12}$ [1]

4. Work out.

Give your answer as a mixed number.

$$\frac{3}{7} + \frac{4}{5}$$

Handwritten work: $\frac{3}{7} + \frac{4}{5} = \frac{15}{35} + \frac{28}{35} = \frac{43}{35}$

$1\frac{8}{35}$ [3]

5. Find a fraction between $\frac{1}{4}$ and $\frac{1}{3}$

Handwritten work:

$$\frac{1}{4} = \frac{6}{24}, \quad \frac{1}{3} = \frac{8}{24}$$

A fraction between $\frac{6}{24}$ and $\frac{8}{24}$ is $\frac{7}{24}$.

Handwritten note: "hmmm!!"

6. Jemma has a bag containing 24 balls.

The probability that a ball taken from the bag at random is green is $\frac{1}{3}$

How many of the 24 balls are green?

$$P(\text{green}) = \frac{1}{3} \quad \frac{1}{3} \times 24$$

.....8..... [2]

7. Circle the fraction that is not equivalent to $\frac{3}{8}$

$$\frac{3}{8} \xrightarrow{\times 2} \frac{6}{16}$$

$$\frac{3}{8} \xrightarrow{\times 2} \frac{6}{16}$$

$$\frac{3}{8} \xrightarrow{\times 3} \frac{9}{24}$$

$$\frac{3}{8} \xrightarrow{\times 4} \frac{12}{32}$$

$$\frac{15}{35}$$

[1]

8. Complete the table.

Minutes	Hours
30	$\frac{1}{2}$
40	$\frac{2}{3}$
135	$2\frac{1}{4} = 60 + 60 + 15$

$$\frac{40}{60} = \frac{4}{6} = \frac{2}{3}$$

[2]

9. Write 180 g as a fraction of 3 kg $\leftarrow 3000\text{g}$

Give your answer in its simplest form.

$$\frac{180}{3000} = \frac{18}{300} \xrightarrow{\times 6} \frac{6}{50} = \frac{3}{25}$$

[2]

10. Work out $2\frac{3}{4} \times 1\frac{5}{7}$

$$\frac{11}{4} \times \frac{12}{7}$$

$$\begin{array}{r} 28 \quad 56 \\ 28 \quad 56 \\ \hline 56 \quad 112 \end{array}$$

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

$$\frac{11 \times 12}{4 \times 7} = \frac{121}{28} = 4\frac{9}{28}$$

$$\begin{array}{r} 121 \\ -112 \\ \hline 9 \end{array} \quad [3]$$

11. Write 0.037 as a fraction.

$$\frac{37}{1000}$$

$$3.7 = \frac{37}{10}$$

$$0.37 = \frac{37}{100}$$

[1]

12. There are only black pens and green pens in a box.

The ratio of the number of black pens in the box to the number of green pens in the box is 2 : 5

What fraction of the pens are black?

$$\frac{B}{2} : \frac{G}{5}$$

$$\frac{2}{7}$$

..... [1]

13. Sam buys 20 boxes of oranges.

There are 25 oranges in each box.

$$\text{Total oranges} = 20 \times 25 = 500$$

(20) Each boxes of oranges costs £7 $\text{Cost} = 20 \times 7 = \text{£}140$

Sam sells $\frac{2}{5}$ of the oranges he bought.

He sells each of these oranges for 40p.

He then sells each of the remaining oranges at 3 oranges for 50p.

Did Sam make a profit or did Sam make a loss?

You must show working to justify your answer.

$$\text{sells } \frac{2}{5} \text{ of } 500 = 200 \times 0.40 = \text{£}80$$

$$\text{The rest } 500 - 200 = 300$$

$$3 \text{ oranges for } 50p$$

$$100 \times 0.5 = \text{£}50$$

$$\text{£}130$$

$$\text{Sam made a loss } (140 - 130 = \text{£}10)$$

[5]

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

$\times 35 \left(\frac{10}{35} + \frac{7}{35} \right) \times 7$

$\frac{17}{35}$

[2]

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

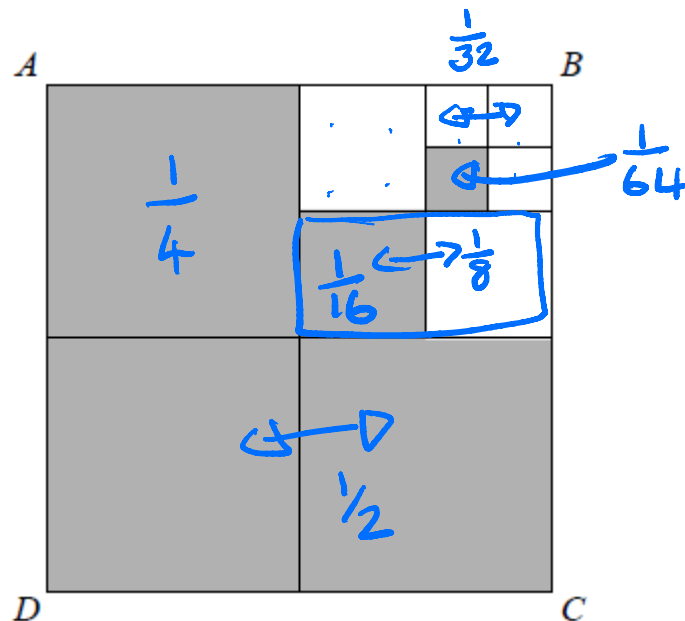
$\frac{5}{3} \div \frac{3}{4}$

$\frac{5}{3} \times \frac{4}{3}$

$\frac{20}{9}$

[2]

15. ABCD is a square.



$\frac{11}{64}$ not shaded

This diagram is drawn accurately.

What fraction of the square ABCD is shaded?

$\frac{1}{2} + \frac{1}{4} + \frac{1}{16} + \frac{1}{64}$

$\frac{32}{64} + \frac{16}{64} + \frac{4}{64} + \frac{1}{64} = \frac{53}{64}$

[2]

16. There are 25 boys and 32 girls in a club.

$$\frac{1}{5} \text{ of } 25 = 5 \quad \frac{2}{5} \text{ of the boys and } \frac{2}{5} \text{ of } 25 = 10$$

$$\frac{1}{2} \text{ of } 32 = 16 \quad \frac{1}{2} \text{ of the girls walk to the club.} = 16$$

The club leader picks at random a child from the children who walk to the club. 26

Work out the probability that this child is a boy.

$$\frac{10}{26} = \frac{5}{13}$$

..... [3]

17. Here are five fractions.

$$\frac{1}{4}, \frac{2}{8}, \frac{10}{40}, \frac{12}{48}, \frac{5}{24}$$

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 $\frac{4}{5} \div \frac{3}{10}$

$$\frac{4}{5} \times \frac{10}{3} = \frac{40}{15} = \frac{8}{3}$$

Give your answer in its simplest form.

$$2\frac{2}{3}$$

..... [2]

18.

Living to 100 years old

1 in 3 babies born last year
are expected to live
to 100 years old

1 in 3 means
 $\frac{1}{3}$

720 000 babies were born last year.

$$\begin{array}{r} 240000 \\ 3 \overline{) 720000} \end{array}$$

How many of these babies are expected to live to 100 years old?

$$\frac{1}{3} \text{ of } 720,000 = \frac{720000}{3} = 240,000 \quad [2]$$

19. There are 35 pens in a box.

15 of the pens are green.

The rest of the pens are red.

What fraction of the pens in the box are red?

$$\begin{array}{l} G \quad R \\ 15 \quad 20 \leftarrow 35 - 15 \end{array}$$

$$\frac{20}{35} = \frac{4}{7}$$

..... [1]

20. 120 men and 80 women were asked if they drive to work.

Altogether $\frac{1}{4}$ of the people said yes.

$\frac{1}{3}$ of the men said yes.

What fraction of the women said yes?

	m	w	total
	120	80	200
<u>asked.</u>			
	$\frac{1}{3} \text{ of } 120$		$\frac{1}{4} \text{ of } 200$
	<u>40</u>		= 50
		so 10 women said yes.	

$$\text{fraction} = \frac{10}{80} = \frac{1}{8}$$

[4]

21. In Scotland, squirrels are red or grey in the ratio red : grey = $1 : 2\frac{1}{2}$

What fraction of the squirrels in Scotland are red?

$$\frac{1}{3.5} = \frac{10}{35} \quad \frac{2}{7}$$

$\xrightarrow{\times 10} \quad \xrightarrow{\div 5}$

[2]

22. There are 20 students.

12 are boys.

What fraction are boys? Circle your answer.

$$\frac{12}{20} = \frac{6}{10} = \frac{3}{5}$$

[1]

$$\frac{2}{3} \times$$

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

$$\left(\frac{3}{5} \right)$$

$$\frac{3}{4} \times$$

23. Which of $\frac{2}{5}$ or $\frac{5}{8}$ is closer in value to $\frac{1}{2}$? = $\frac{20}{40}$

You must show your working.

$$\frac{2}{5} \rightarrow \frac{16}{40} \quad \times 8$$

$$\frac{5}{8} \rightarrow \frac{25}{40} \quad \times 5$$

$$\frac{16}{40} \text{ is closer to } \frac{20}{40}$$

$$\therefore \boxed{\frac{2}{5}} \quad [3]$$

24. A drink is mixed in the ratio

$$\text{lemonade : orange : cranberry} = 6 : 3 : 2 \quad \text{L O C}$$

What fraction is orange?

Circle your answer.

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

[1]

$$\frac{3}{8}$$

$$\frac{2}{11}$$

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

$$\frac{6}{11}$$

25. Jody's pay is £315 per week.

She works for $37\frac{1}{2}$

Work out her hourly rate of pay.

$$315 \div 37.5 = £8.40$$

[2]

26. What is one quarter of 5 hours? $5 \times 60 = 300$ $300 \div 4 = 75 \text{ mins}$

Tick a box.

1 hour 15 minutes

75 mins

☒

115 minutes

1 hr 55 mins

☐

1 hour 25 minutes

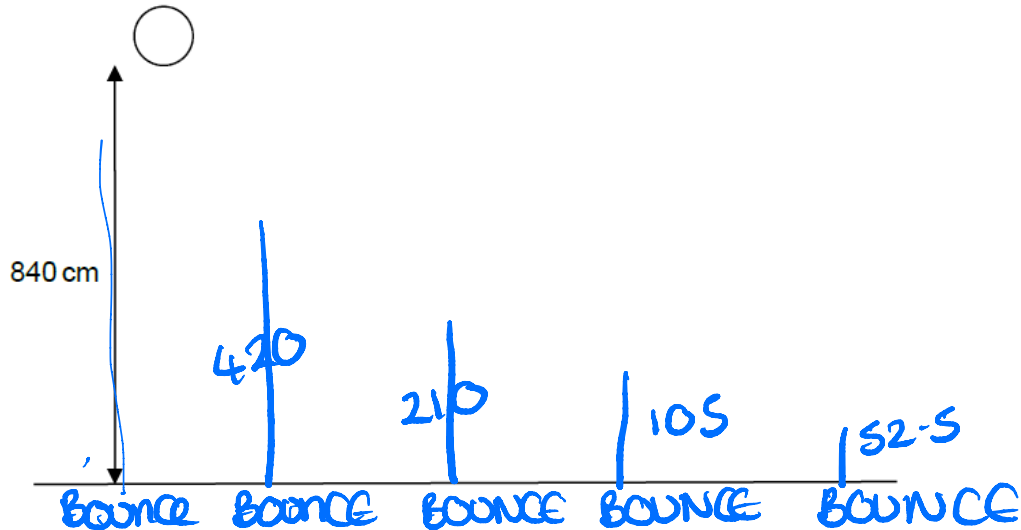
☐

125 minutes

☐

[1]

27. A ball is dropped from a height of 840 cm onto a floor.



After each bounce it rises to a height that is half of the distance it has just fallen.

After how many bounces will the ball fail to reach a height of 1m for the first time?

You must show all your working.

\therefore 5 bounces

[3]

28. In a school, $\frac{3}{5}$ of the pupils are girls.

$$\frac{3}{5} = 390$$

$$\frac{1}{5} = 130$$

There are 390 girls in the school.

Calculate the total number of pupils in the school.

$$\therefore \frac{5}{5} \text{ ie whole} = 130 \times 5 = \underline{650}$$

[3]

29. Faizal has £400.

He spends $\frac{1}{4}$ of it on rent and $\frac{2}{5}$ of it on food.

Rent
£100

Food
 $\frac{1}{5} = 80$
 $\frac{2}{5} = \underline{160}$

What fraction does he have left?

Write your answer in its simplest terms.

Total = 260
Left = 140

$$\text{as a fraction } \frac{140}{400} = \frac{14}{40} = \frac{7}{20}$$

[4]

30. One sheet of A3 card has area $\frac{1}{8} \text{ m}^2$

The card has a mass of 160 g per m^2

Work out the total mass of 25 sheets of A3 card

$$25 \times 20\text{g} = \underline{500\text{g}}$$

$$\frac{1}{8} \text{ of } 160\text{g} = 20\text{g per sheet}$$

[4]

31. How many minutes are there in $3\frac{1}{4}$ hours?

$$\begin{array}{r} 3 \times 60 = 180 \\ + 15 \\ \hline 195 \end{array}$$

.....19..... minutes [1]

32. Here are four fractions.

$$\frac{1}{2} \quad \frac{12}{24} \quad \frac{17}{24}$$

$$\frac{3}{4} \quad \frac{18}{24} \quad \frac{5}{12} \quad \frac{10}{24}$$

$\swarrow \times 6$ $\swarrow \times 2$

Write these fractions in order of size.

Start with the smallest fraction.

$$\frac{5}{12} \quad \frac{1}{2} \quad \frac{17}{24} \quad \frac{18}{24}$$

[2]

33. Work out $\frac{4}{5}$ of 210 cm.

$$\frac{1}{5} = 42 \quad \frac{4}{5} =$$

.....168..... cm [1]

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

$$\frac{4}{10} + \frac{5}{10} = \frac{9}{10}$$

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.

She hasn't adjusted the numerators when finding common denominator of 10

[1]

Dave worked out $1\frac{1}{2} \times 5\frac{1}{3} = \frac{3}{2} \times \frac{16}{3} = \frac{48}{6} = 8$

He wrote:

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

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

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

(b) Describe one mistake that Dave made.

its better to convert mixed number fractions to top heavy fractions.

[1]

35. Work out $\frac{3}{5}$ of 200

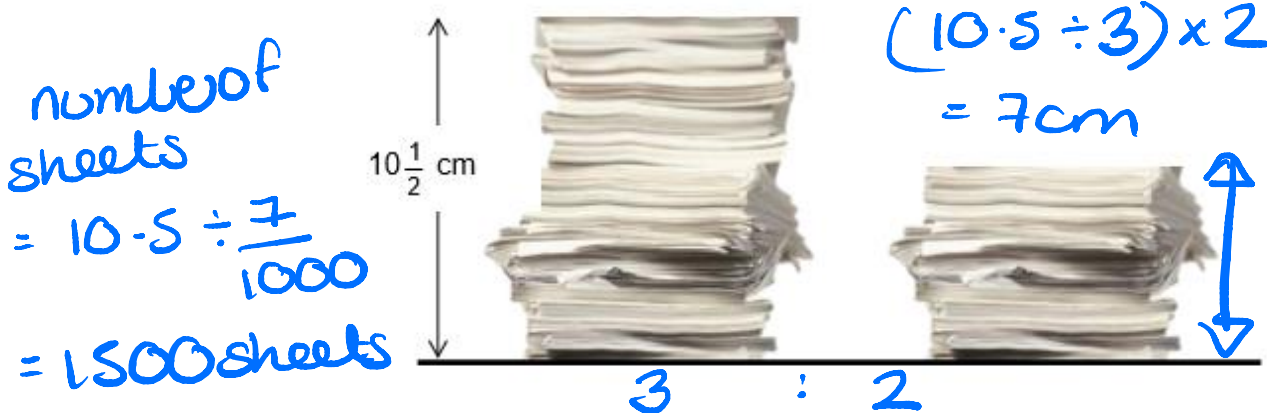
$$\frac{1}{5} = 40 \quad \frac{3}{5} = 120$$

[2]

36. Here are two piles of the same type of paper.

Each sheet of paper is $\frac{7}{1000}$ cm thick.

The taller pile is $10\frac{1}{2}$ cm high.



height of taller pile : height of shorter pile = 3 : 2

Work out the number of sheets of paper in the shorter pile.

$$1500 \div 3 = 500 \quad 500 \times 2 = 1000 \text{ sheets}$$

[3]

37. In a class, the number of girls as a fraction of the number of boys is $\frac{5}{4}$ ^{girls.}_{boys.}

a) Write down the number of boys as a fraction of the number of girls.

$$\frac{\text{boys}}{\text{girls}} = \frac{4}{5}$$

[1]

b) There are 20 girls in the class. Work out the number of boys.

20 girls

$$\frac{\text{girls}}{\text{boys}} = \frac{5}{4} = \frac{20}{?}$$

$\times 4$ (from 5 to 20)

$\times 4$ (from 4 to ?)

[2]

$$\text{boys} = \underline{\underline{16}}$$