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

\[
\frac{1}{4} \times 16 = 4
\]

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.

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

What fraction is cracked?

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

4. Work out.

\[
\frac{3}{7} + \frac{4}{5} \times \frac{15}{38} \times \frac{35}{28} = \frac{43}{35}
\]

Give your answer as a mixed number.

\[
\frac{18}{24} = \frac{3}{4}
\]

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

\[
\frac{1}{4} + \frac{1}{3} \times \frac{3}{12} = \frac{7}{24}
\]

\[
\frac{1}{3} \times 8 = \frac{8}{24}
\]

Hmmmm!!
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?
   \[
   P(\text{green}) = \frac{1}{3} \quad \frac{1}{3} \times 24
   \]
   \[8\]

7. Circle the fraction that is not equivalent to \( \frac{3}{8} \times \frac{2}{4} \)
   \[
   \frac{3}{8} \quad \frac{6}{16} \quad \frac{3}{8} \quad \frac{9}{24} \quad \frac{3}{8} \quad \frac{12}{32}
   \]
   \[\frac{15}{35}\]
   \[1\]

8. Complete the table.

<table>
<thead>
<tr>
<th>Minutes</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>(\frac{1}{2})</td>
</tr>
</tbody>
</table>

   \[
   \frac{40}{60} = \frac{4}{6} = \frac{2}{3} \quad \frac{2}{3} \quad 40
   \]
   \[
   135 \quad 2 \frac{1}{4} = 60 + 60 + 15
   \]
   \[2\]

9. Write 180 g as a fraction of 3 kg
   \[
   \frac{180}{3000} = \frac{18}{300} = \frac{3}{50}
   \]
   \[2\]

10. Work out \( \frac{3}{4} \times \frac{5}{7} \)
    \[
    \frac{11}{4} \times \frac{12}{7}
    \]
    \[
    \frac{28}{56} \frac{56}{56} \quad \frac{28}{56} \frac{56}{56}
    \]
    \[
    \frac{28}{56} \frac{28}{56}
    \]
    \[3\]
11. Write 0.037 as a fraction.

\[
\frac{37}{1000}
\]

[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?

\[
\frac{2}{7}
\]

[1]

13. Sam buys 20 boxes of oranges.

There are 25 oranges in each box.

Each box of oranges costs £7

Cost = 20 \times 7 = £140

Total oranges = 20 \times 25 = 500

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.

Sells \(\frac{2}{5}\) of 500 = 200 \times 0.40 = £80

The rest 500 - 200 = 300

3 oranges for 50p = \(\frac{100 \times 0.5}{3} = \£130\)

Sam made a loss (140 - 130 = £10)

[5]
14. (a) Work out \( \frac{2}{7} + \frac{1}{5} \times \left( \frac{10+4}{35} \right) \times \frac{7}{4} \)

\[ \frac{13}{35} \]

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

\[ \frac{20}{9} \]

15. ABCD is a square.

This diagram is drawn accurately.

What fraction of the square ABCD is shaded?

\[ \frac{1}{2} + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} \]

\[ \frac{32}{64} + \frac{16}{64} + \frac{4}{64} + \frac{1}{64} = \frac{53}{64} \]
16. There are 25 boys and 32 girls in a club.

\[ \frac{2}{5} \text{ of the boys and } \frac{1}{2} \text{ of the girls walk to the club.} \]

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

Work out the probability that this child is a boy.

\[ \frac{10}{26} = \frac{5}{13} \]

17. Here are five fractions.

\[ \frac{2}{8}, \frac{10}{40}, \frac{12}{48}, \frac{5}{24}, \frac{4}{80} \]

One of these fractions is not equivalent to \( \frac{1}{4} \)

(a) Write down this fraction.

\[ \frac{5}{24} \]

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

\[ \times 2 \left( \frac{4}{14} + \frac{1}{14} \right) \]

\[ \frac{5}{14} \]

(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.

\[ 2 \frac{2}{3} \]

18.

720 000 babies were born last year.
How many of these babies are expected to live to 100 years old?

\[ \frac{1}{3} \text{ of } 7,200,000 = \frac{7,200,000}{3} = 2,400,000 \]  [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?

\[ \frac{20}{35} = \frac{4}{7} \]  [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?

\[ \text{Fraction} = \frac{10}{80} = \frac{1}{8} \]  [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?

\[ \frac{1}{3.5} = \frac{10}{35} = \frac{2}{7} \]  [2]

22. There are 20 students.

   12 are boys.
   What fraction are boys? Circle your answer.

\[ \frac{2}{3} \times \frac{2}{5} \times \frac{3}{5} = \frac{3}{4} \times \]  [1]
23. Which of $\frac{2}{5}$ or $\frac{5}{8}$ is closer in value to $\frac{1}{2}$? 

\[ \frac{2}{5} \times 8 = \frac{16}{40} \quad \text{and} \quad \frac{5}{8} \times 6 = \frac{25}{40} \]

\[ \frac{16}{40} \text{ is closer to } \frac{20}{40} \quad \therefore \quad \frac{2}{5} \]  

[3]

24. A drink is mixed in the ratio lemonade : orange : cranberry = 6 : 3 : 2

What fraction is orange? \[ \frac{3}{11} \]

Circle your answer. \[ \frac{3}{8} \quad \frac{2}{11} \quad \boxed{\frac{3}{11}} \quad \frac{6}{11} \]

[1]

25. Jody’s pay is £315 per week.

She works for 37 $\frac{1}{2}$ hours per week.

Work out her hourly rate of pay.

\[ 315 \div 37.5 = £8.40 \]

[2]

26. What is one quarter of 5 hours? \[ 5 \times 60 = 300 \quad 300 \div 4 = 75 \text{ minutes} \]

Tick a box.

- 1 hour 15 minutes
- 1 hour 30 minutes
- 1 hour 45 minutes
- 1 hour 50 minutes
- 1 hour 55 minutes
- 1 hour 60 minutes
- 125 minutes

[1]
27. A ball is dropped from a height of 840 cm onto a floor.

![Diagram showing the ball bounces]

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.

\[ \therefore 5 \text{ bounces} \]

[3]

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

There are 390 girls in the school.

Calculate the total number of pupils in the school.

\[ \therefore \frac{5}{5} \text{ in whole} = 130 \times 5 \]

\[ = 650 \]

[3]

29. Faizal has £400.

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

What fraction does he have left?
Write your answer in its simplest terms.

\[ \text{Rent} \quad \text{Food} \]
\[ \£100 \quad \frac{2}{5} = 160 \]

\[ \text{Total} = 260 \]
\[ \text{Left} = 140 \]

\[ \text{as a fraction} \quad \frac{140}{400} = \frac{14}{40} = \frac{7}{20} \]

[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

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

[4]

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

$$3 \times 60 = 180 + 15 = 195 \text{ minutes}$$

[1]

32. Here are four fractions.

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

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.

$$\frac{1}{5} = 42 \quad \frac{4}{5} = 168 \text{ cm}$$

[1]

34. 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.

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

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

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.

It's better to convert mixed numbers to top heavy fractions.

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

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

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.

$$\text{number of sheets} = 10 \frac{1}{2} \div \frac{7}{1000} = 1500 \text{ sheets}$$

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

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

$$1500 \div 3 = 500 \quad 500 \times 2 = 1000$$
37. In a class, the number of girls as a fraction of the number of boys is \( \frac{5}{4} \).

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.

\[
\frac{\text{girls}}{\text{boys}} \times 4 = \frac{5}{4} \times 4
\]

\[
\frac{20}{\text{boys}} = \frac{20}{16} = \frac{16}{\text{boys}}
\]

[2]