# Answers - Fractions

Year: Year 7

## Answer to Question 1

a. $12 \div 3 = 4$, so multiply the top by 4: $2 \times 4 = 8$
b. $20 \div 5 = 4$, so multiply the bottom by 4: $8 \times 4 = 32$
c. $48 \div 4 = 12$, so divide the top by 12: $36 \div 12 = 3$
d. Multiply the top and bottom by the same number: $\frac{3 \times 2}{5 \times 2} = \frac{6}{10}$ and $\frac{3 \times 3}{5 \times 3} = \frac{9}{15}$.

Any correct pair is accepted.

## Answer to Question 2

To simplify fully, divide the numerator and the denominator by their highest common factor. If you divide by a smaller common factor, keep going until no common factor is left.

a. HCF = 6, so $\frac{3}{4}$
b. HCF = 15, so $\frac{3}{4}$
c. HCF = 42, so $\frac{2}{3}$
d. HCF = 50, so $\frac{3}{4}$

$\frac{18}{24}$, $\frac{45}{60}$ and $\frac{150}{200}$ all equal $\frac{3}{4}$, so (a), (b) and (d). Part (c) is $\frac{2}{3}$.

## Answer to Question 3

To change an improper fraction into a mixed number, divide the numerator by the denominator: the quotient is the whole number and the remainder is the new numerator. To go back, multiply the whole number by the denominator and add the numerator.

a. $17 \div 5 = 3$ remainder 2: $3\frac{2}{5}$
b. $29 \div 8 = 3$ remainder 5: $3\frac{5}{8}$
c. $3 \times 4 + 3 = 15$: $\frac{15}{4}$
d. $5 \times 9 + 2 = 47$: $\frac{47}{9}$

e. $\frac{23}{6} = 3\frac{5}{6}$ because $23 \div 6 = 3$ remainder 5. They are **equal**.

## Answer to Question 4

a. Common denominator 24: $\frac{16}{24}, \frac{18}{24}, \frac{15}{24}, \frac{14}{24}$. Order: $\frac{7}{12}, \frac{5}{8}, \frac{2}{3}, \frac{3}{4}$.
b. Common denominator 20: $\frac{14}{20}, \frac{15}{20}, \frac{13}{20}, \frac{16}{20}$. Largest first: $\frac{4}{5}, \frac{3}{4}, \frac{7}{10}, \frac{13}{20}$.
c. Using twelfths: $\frac{6}{12}$ and $\frac{8}{12}$, so $\frac{7}{12}$ works (many answers are possible).

Writing every fraction with the same denominator turns the comparison into a comparison of whole numbers, which is much easier than guessing from the size of the pieces.

## Answer to Question 5

a. The denominators are already the same, so add the numerators: $2 + 1 = 3$, giving $\frac{3}{5}$.
b. The lowest common multiple of 3 and 4 is 12: $\frac{4}{12} + \frac{3}{12} = \frac{7}{12}$.
c. LCM of 6 and 4 is 12: $\frac{10}{12} - \frac{3}{12} = \frac{7}{12}$.
d. LCM of 3 and 5 is 15: $\frac{10}{15} + \frac{9}{15} = \frac{19}{15}$, which is $1\frac{4}{15}$ as a mixed number.
e. Change to improper fractions: $\frac{5}{2} + \frac{7}{4} = \frac{10}{4} + \frac{7}{4} = \frac{17}{4} = 4\frac{1}{4}$.
f. $\frac{16}{5} - \frac{17}{10} = \frac{32}{10} - \frac{17}{10} = \frac{15}{10} = 1\frac{1}{2}$ after simplifying.

In every part, check that the answer is fully simplified and that improper fractions have been written as mixed numbers.

## Answer to Question 6

a. Divide by the denominator, then multiply by the numerator: $36 \div 3 = 12$, $12 \times 2 =$ **24**.
b. One fifth of 45 is $45 \div 5 = 9$, so three fifths is $9 \times 3 =$**27**.
c. One eighth of 64 kg is 8 kg, so seven eighths is $8 \times 7 =$**56 kg**.
d. One twelfth of £84 is £7, so five twelfths is $7 \times 5 =$**£35**.

Check: each answer is less than the whole amount, as it should be for a fraction smaller than 1.

## Answer to Question 7

a. Common denominator 24: $\frac{15}{24}$ and $\frac{14}{24}$. Pizza A has had more eaten.

b. $1-\frac{5}{8}=\frac{3}{8}$

c. Pizza A: 3 slices. Pizza B: $12-7=5$ slices. Total **8 slices**.

d. Dev added the tops and the bottoms. You must use a common denominator: $\frac{15}{24}+\frac{14}{24}=\frac{29}{24}=1\frac{5}{24}$ pizzas.

## Answer to Question 8

a. $48\div 4=$**12**

b. $48\div 3=$**16**

c. $1-\frac{1}{4}-\frac{1}{3}=\frac{12-3-4}{12}=\frac{5}{12}$

d. Sold: $12+16=28$. Money: $28\times 75=2100$p = **£21**

e. $\frac{5}{6}$ of $48=40$ cupcakes, $40\times 0.75=30$. She raises exactly £30, so she is **not** right (it is not more than £30).

Check: $12+16=28$ cupcakes sold and $48-28=20$ left, and $\frac{20}{48}=\frac{5}{12}$, which agrees with part (c).

## Answer to Question 9

a. $360\div 5=72$, $72\times 2=144$: **£144**

b. $360\div 4=$**£90**

c. $1-\frac{2}{5}-\frac{1}{4}=\frac{20-8-5}{20}=\frac{7}{20}$

d. Pupils pay $\frac{7}{20}\times 360=126$, so each pays $126\div 24=5.25$, that is **£5.25**.

Check: $144+90+126=360$, so the three shares add up to the whole cost of the trip. Each pupil pays **£5.25**.

## Answer to Question 10

a. Change to improper fractions with denominator 4: $\frac{5}{2}+\frac{7}{4}=\frac{10}{4}+\frac{7}{4}=\frac{17}{4}=4\frac{1}{4}$ litres of green paint.

b. She needs $3\frac{1}{5}$ litres and has $1\frac{7}{10}$. In tenths: $\frac{32}{10} - \frac{17}{10} = \frac{15}{10} = 1\frac{1}{2}$ litres more.

c. Dividing by 5 is the same as multiplying by $\frac{1}{5}$: $\frac{17}{4} \times \frac{1}{5} = \frac{17}{20}$ of a litre in each jar, a little less than 1 litre.

## Answer to Question 11

First write the route as an improper fraction: $5\frac{1}{2} = \frac{11}{2}$ km. A fraction "of" the route means multiply.

a. $\frac{3}{4} \times \frac{11}{2} = \frac{33}{8} = 4\frac{1}{8}$ km

b. Wednesday: 11 km. Friday: $\frac{2}{3} \times \frac{11}{2} = \frac{11}{3}$ km. In 24ths: Monday $\frac{99}{24}$, Wednesday $\frac{264}{24}$, Friday $\frac{88}{24}$. Total $\frac{451}{24} = 18\frac{19}{24}$ km

c. $20 - 18\frac{19}{24} = 1\frac{5}{24}$ km

She has run just under 19 km, so she still needs a little over 1 km to reach the coach's target.

## Answer to Question 12

a. $\frac{1}{5}$ of 60 is 12, so $\frac{2}{5}$ is $12 \times 2 =$ **24 m²** of potatoes.

b. Common denominator 20: $1 - \frac{8}{20} - \frac{5}{20} = \frac{7}{20}$ is grass and path.

c. Carrots use $\frac{1}{4}$ of 60, which is 15 m². Shared between 3 rows: $15 \div 3 =$ **5 m²** per row.

d. $\frac{1}{4}$ of 24 is 6, so $\frac{3}{4}$ is $6 \times 3 =$ **18 m²** of new potatoes.

## Answer to Question 13

a. $\frac{1}{8}$ of 240 is 30 litres, so $\frac{3}{8}$ is $30 \times 3 =$ **90 litres**.

b. The level rises from $\frac{3}{8}$ to $\frac{7}{8}$: $\frac{7}{8} - \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$ of the butt.

c. $\frac{7}{8}$ of 240 is $30 \times 7 =$ **210 litres** (90 litres plus the 120 litres he added).

d. The plants use $\frac{1}{4}$ of 210, which is 52.5 litres. Left: $210 - 52.5 =$ **157.5 litres**.

## Answer to Question 14

a. How many $\frac{3}{20}$ fit into $\frac{9}{10}$ is a division. Flip and multiply: $\frac{9}{10} \times \frac{20}{3} = \frac{180}{30} =$**6 pieces**.
b. $1\frac{1}{2} = \frac{3}{2}$. $\frac{3}{2} \div \frac{3}{20} = \frac{3}{2} \times \frac{20}{3} = \frac{60}{6} =$**10 pieces**.
c. In tenths: $\frac{9}{10} + \frac{15}{10} = \frac{24}{10} = 2\frac{2}{5}$ m, enough for $6 + 10 = 16$ pieces.

## Answer to Question 15

a. Common denominator 24: $\frac{8}{24} + \frac{9}{24} + \frac{2}{24} = \frac{19}{24}$, so prizes are $\frac{5}{24}$
b. Music: £80. Food: £90. Decorations: £20. Prizes: $\frac{5}{24} \times 240 =$£50. (Check: $80 + 90 + 20 + 50 = 240$.)
c. Prizes get £50, which is more than £30. Yes, there is enough.
d. $240 \div 2.50 = 96$ tickets: **96**

The fractions in the table must add up to 1 (the whole budget), which is why we subtract them from 1 to find the share for prizes.

## Answer to Question 16

a. Week 1: 2.5 km. Week 2: 4 km. Week 3: 6 km. Week 4: 9 km.
b. $\frac{1}{4} + \frac{2}{5} = \frac{5}{20} + \frac{8}{20} = \frac{13}{20}$
c. Twice week 1 is 5 km, plus 0.5 km is 5.5 km. No week has 5.5 km, so the answer is **no**.
d. Three times week 1 is 7.5 km. Week 4 is 9 km, which is bigger, so **yes**.
e. He needs 10 km in week 5, so 1 km more than week 4: **1 km** ($\frac{1}{10}$ of 10 km).

## Answer to Question 17

Work in stages: the afternoon fraction is a fraction of what is *left*, not of the original 4 kg.

a. $4 \times \frac{3}{8} = \frac{12}{8} =$**1.5 kg**
b. $4 - 1.5 =$**2.5 kg**
c. $\frac{2}{5} \times 2.5 =$**1 kg**
d. Sold: 2.5 kg = 25 lots of 100 g, so $25 \times 1.20 =$**£30**

e. Left: 1.5 kg. Fraction: $\frac{1.5}{4} = \frac{3}{8}$: $\frac{3}{8}$

Check: $1.5 + 1 + 1.5 = 4$ kg, so the amounts sold and left add up to the original stock.

## Answer to Question 18

a. Common denominator 24: $\frac{9}{24} + \frac{6}{24} + \frac{4}{24} + \frac{2}{24} = \frac{21}{24}$, so train is $\frac{3}{24} = \frac{1}{8}$

b. Walk 45, bus 30, car 20, cycle 10, train 15. (Total 120.)

c. $1 - \frac{3}{8} = \frac{5}{8}$

d. Car + bus = $\frac{1}{6} + \frac{1}{4} = \frac{5}{12}$, which is less than $\frac{1}{2} = \frac{6}{12}$. She is **not** correct (50 pupils out of 120).

## Answer to Question 19

a. 36 is 3 times 12. Flour $4\frac{1}{2}$ cups, butter $2\frac{1}{4}$ cups, sugar 1 cup, milk 2 cups.

b. Half the recipe: flour $\frac{3}{4}$ cup, butter $\frac{3}{8}$ cup, sugar $\frac{1}{6}$ cup, milk $\frac{1}{3}$ cup.

c. Flour for one scone is $1\frac{1}{2} \div 12 = \frac{1}{8}$ cup. $2 \div \frac{1}{8} = 16$, so she can make **16 scones**.

d. No. $\frac{2}{3} - \frac{1}{2} = \frac{4}{6} - \frac{3}{6} = \frac{1}{6}$, so she is short by $\frac{1}{6}$ cup.

## Answer to Question 20

a. Ali added tops and bottoms. Correct: $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

b. Beth multiplied by the fraction instead of flipping it. Correct: $\frac{3}{4} \times \frac{2}{1} = \frac{6}{4} = 1\frac{1}{2}$

c. Carl multiplied the whole numbers and the fractions separately. Correct: $\frac{3}{2} \times \frac{7}{3} = \frac{21}{6} = 3\frac{1}{2}$

d. Ali: $\frac{2}{5}$ is smaller than $\frac{1}{2}$, but we added something to $\frac{1}{2}$, so the answer must be bigger than $\frac{1}{2}$.

## Answer to Question 21

a. $\frac{1}{5}$ of £20 is £4, so $\frac{2}{5}$ is **£8** saved.
b. $\frac{1}{4}$ of £20 is **£5** on snacks.
c. $20 - 8 - 5 =$**£7** is left after saving and snacks.
d. The magazine is $\frac{1}{5}$ of the £7 that remains: $7 \div 5 =$**£1.40**.
e. Bus fares: $7 - 1.40 = £5.60$. As a fraction of £20: $\frac{5.60}{20} = \frac{56}{200} = \frac{7}{25}$ after dividing by 8.

## Answer to Question 22

a. $45 \div 3 \times 5 =$**75 litres**
b. $2.5 - 0.5 =$**2 litres per minute**
c. Needed: $75 - 45 = 30$ litres. $30 \div 2 =$**15 minutes**
d. Net rate is $2.5 - 0.75 = 1.75$. $30 \div 1.75 = 17\frac{1}{7}$ minutes, so it takes $2\frac{1}{7}$ minutes longer (about 2 min 9 s).

The tank fills more slowly with the bigger leak because the net rate falls from 2 to 1.75 litres per minute, so each litre takes longer to add.