



KS3.M-N9 Fractions: Adding and Subtracting

AQA KS3.M-N9 · Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Write each fraction as a fraction with denominator 12.
- (a) Write $\frac{1}{3}$ with denominator 12. (1)
- (b) Write $\frac{5}{6}$ with denominator 12. (1)
- (c) Write $\frac{1}{4}$ with denominator 12. (1)
- (d) Write $\frac{7}{12}$ with denominator 12. (1)
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- 2** Calculate and simplify where possible: $\frac{1}{2} + \frac{1}{6}$. (2)
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- 3** Add or subtract. Give your answers in simplest form.
- (a) $\frac{3}{8} + \frac{1}{4}$ (1)
- (b) $\frac{7}{10} - \frac{1}{5}$ (1)
- (c) $\frac{5}{12} + \frac{1}{3}$ (1)

4 Write each mixed number as an improper fraction.

(a) Write $2 \frac{1}{3}$ as an improper fraction. (1)

(b) Write $3 \frac{2}{5}$ as an improper fraction. (1)

5 Add these mixed numbers: $2 \frac{1}{2} + 2 \frac{2}{3}$. Give your answer as a mixed number in simplest form.

(3)

6 Work out $4 \frac{2}{3} - 1 \frac{5}{6}$. Give your answer in simplest form.

(4)

7 A recipe needs $1 \frac{3}{4}$ cups of flour. Jake has already put in $\frac{2}{3}$ cup. How much more flour does he need?

(2)

8 Simplify fully and show working: $\frac{3}{5} + \frac{7}{15} - \frac{1}{3}$.

(3)

- 9** A class collects $\frac{3}{4}$ kg of food, $\frac{5}{6}$ kg of supplies and $\frac{2}{3}$ kg of clothing. Find the total weight collected. Give your answer as a mixed number in simplest form if necessary.

(4)

- 10** Subtract and simplify: $1\frac{1}{6} - \frac{4}{3}$.

(3)

- 11** Write each of these as a fraction in simplest form: $\frac{8}{12} - \frac{1}{4}$.

(2)

- 12** Olivia cycles $2\frac{1}{2}$ km before breakfast and $3\frac{3}{4}$ km after school. How far does she cycle in total? Give your answer as a mixed number.

(3)

- 13** Calculate and simplify: $\frac{7}{9} + \frac{2}{3} + \frac{1}{6}$.

(4)

- 14** A baker uses $1\frac{2}{3}$ kg of sugar for one batch and $2\frac{1}{2}$ kg for another batch. How much more sugar is used in the second batch than the first? Give your answer in simplest form.

(3)

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- 15** Work out and simplify: $2\frac{3}{5} + 4\frac{4}{5} - 1\frac{7}{10}$.

(4)

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- 16** Simplify fully: $(\frac{3}{4} + \frac{2}{3}) - (\frac{5}{12})$.

(3)

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- 17** Three friends share a $5\frac{1}{3}$ litre juice box. Sarah drinks $1\frac{1}{4}$ litres and Amir drinks $1\frac{2}{5}$ litres. How much is left? Give your answer in simplest form.

(4)

- 18** Stretch: A mural is $7\frac{1}{2}$ metres long. Three painters paint sections measuring $1\frac{7}{10}$ m, $2\frac{3}{5}$ m and $1\frac{4}{15}$ m. Will the whole mural be painted? If not, how much remains unpainted? Give your answer in simplest form.

(5)

Mark scheme · KS3.M-N9 Fractions: Adding and Subtracting

Question 1

- (a) **B1** $4/12$ cao
- (a) Answer: **4/12**
- (b) **B1** $10/12$ cao
- (b) Answer: **10/12**
- (c) **B1** $3/12$ cao
- (c) Answer: **3/12**
- (d) **B1** $7/12$ cao
- (d) Answer: **7/12**

Question 2

- **M1** correct common denominator or method, e.g. $1/2 = 3/6$ then $3/6 + 1/6$
- **A1** $2/3$ cao
- Answer: **2/3**

Question 3

- (a) **B1** $5/8$ cao
- (a) Answer: **5/8**
- (b) **B1** $1/2$ cao
- (b) Answer: **1/2**
- (c) **B1** $9/12$ or simplified $3/4$ cao
- (c) Answer: **3/4**

Question 4

- (a) **B1** $7/3$ cao
- (a) Answer: **7/3**
- (b) **B1** $17/5$ cao
- (b) Answer: **17/5**

Question 5

- **M1** convert to improper fractions or add whole and fraction parts correctly
- **M1** add fractions with common denominator ($1/2 = 3/6$, $2/3 = 4/6$) and convert to mixed number if needed
- **A1** $5 \frac{1}{6}$ cao
- Answer: **5 $\frac{1}{6}$**

Question 6

- **M1** convert mixed numbers to improper fractions ($4 \frac{2}{3} = 14/3$, $1 \frac{5}{6} = 11/6$) or equivalent method
- **M1** use common denominator: $14/3 = 28/6$ then $28/6 - 11/6$
- **M1** calculate difference $17/6$
- **A1** $2 \frac{5}{6}$ cao
- Answer: **2 $\frac{5}{6}$**

Question 7

- **M1** convert to common denominator or convert mixed to improper, e.g. $1 \frac{3}{4} = 7/4$ and $2/3 = 8/12$, $7/4 = 21/12$
- **A1** $13/12$ or $1 \frac{1}{12}$ cao
- Answer: **1 $\frac{1}{12}$**

Question 8

- **M1** use common denominator 15 or equivalent method
- **M1** correct addition/subtraction: $9/15 + 7/15 - 5/15 = 11/15$
- **A1** 11/15 cao
- **Answer: 11/15**

Question 9

- **M1** use common denominator 12 or equivalent: $9/12 + 10/12 + 8/12$
- **M1** add numerators to get 27/12
- **M1** convert improper to mixed number $27/12 = 2 \frac{3}{12}$
- **A1** $2 \frac{1}{4}$ kg cao
- **Answer: 2 1/4 kg**

Question 10

- **M1** use common denominator 6 or convert $4/3$ to $8/6$
- **M1** $11/6 - 8/6 = 3/6$
- **A1** $1/2$ cao
- **Answer: 1/2**

Question 11

- **M1** convert to common denominator or note $1/4 = 3/12$
- **A1** $5/12$ cao
- **Answer: 5/12**

Question 12

- **M1** convert to improper fractions: $2 \frac{1}{2} = 5/2$, $3 \frac{3}{4} = 15/4$ and use common denominator
- **M1** add to get $25/4$
- **A1** $6 \frac{1}{4}$ km cao
- **Answer: 6 1/4 km**

Question 13

- **M1** choose common denominator 18 or equivalent
- **M1** convert each: $14/18 + 12/18 + 3/18$
- **M1** sum to $29/18$
- **A1** $1 \frac{11}{18}$ cao
- **Answer: 1 11/18**

Question 14

- **M1** convert to improper fractions or use common denominators: $5/3$ and $5/2$
- **M1** common denominator 6: $10/6$ and $15/6$ then subtract to get $5/6$
- **A1** $5/6$ kg cao
- **Answer: 5/6 kg**

Question 15

- **M1** convert mixed to improper: $13/5$, $24/5$, $17/10$ or equivalent
- **M1** use common denominator 10: $26/10 + 48/10 - 17/10$
- **M1** calculate result $57/10$
- **A1** $5 \frac{7}{10}$ cao
- **Answer: 5 7/10**

Question 16

- **M1** add $\frac{3}{4} + \frac{2}{3}$ using common denominator 12: $\frac{9}{12} + \frac{8}{12} = \frac{17}{12}$
- **M1** subtract $\frac{5}{12}$: $\frac{17}{12} - \frac{5}{12} = \frac{12}{12}$
- **A1** 1 cao
- **Answer: 1**

Question 17

- **M1** convert to improper fractions: $5 \frac{1}{3} = \frac{16}{3}$, $1 \frac{1}{4} = \frac{5}{4}$, $1 \frac{2}{5} = \frac{7}{5}$
- **M1** use common denominator 60 and find total consumed: $\frac{5}{4} = \frac{75}{60}$, $\frac{7}{5} = \frac{84}{60}$ so sum = $\frac{159}{60}$
- **M1** convert $\frac{16}{3}$ to $\frac{320}{60}$ and subtract: $\frac{320}{60} - \frac{159}{60} = \frac{161}{60}$
- **A1** $2 \frac{41}{60}$ litres cao
- **Answer: 2 $\frac{41}{60}$ litres**

Question 18

- **M1** convert all to improper fractions or common denominator; $7 \frac{1}{2} = \frac{15}{2}$, $1 \frac{7}{10} = \frac{17}{10}$, $2 \frac{3}{5} = \frac{13}{5}$, $1 \frac{4}{15} = \frac{19}{15}$
- **M1** choose common denominator 30 and convert: $\frac{15}{2} = \frac{225}{30}$, $\frac{17}{10} = \frac{51}{30}$, $\frac{13}{5} = \frac{78}{30}$, $\frac{19}{15} = \frac{38}{30}$
- **M1** sum painted sections: $\frac{51}{30} + \frac{78}{30} + \frac{38}{30} = \frac{167}{30}$
- **M1** compare to total: $\frac{225}{30} - \frac{167}{30} = \frac{58}{30}$
- **A1** $\frac{29}{15}$ m or $1 \frac{14}{15}$ m unpainted cao
- **Answer: 1 $\frac{14}{15}$ m**