Unit 4 · Fraction

HARDER PRACTICE QUESTIONS · ANSWER KEY

Full marks 31

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Spot the errors

ANSWER U · 4

i. In the sum she added the numerators **and the denominators**. In the division she multiplied by $\frac{1}{2}$ instead of by its reciprocal, 2.

ii. $\frac{2}{3} + \frac{1}{4} = \frac{8}{12} + \frac{3}{12} = \mathbf{\frac{11}{12}}$, and $\frac{3}{4} \div \frac{1}{2} = \frac{3}{4} \times \frac{2}{1} = \frac{6}{4} = \mathbf{\frac{3}{2}} = \mathbf{1\frac{1}{2}}$.

iii. $\frac{3}{7}$ is less than $\frac{2}{3}$ on its own, but adding should make it bigger. And dividing by a fraction less than 1 gives a **bigger** answer, but $\frac{3}{8}$ is smaller than $\frac{3}{4}$. (How many halves fit in three quarters? One and a half.)

MARKING SCHEME

✓ What went wrong in each.

✓ $\frac{11}{12}$.

✓ $1\frac{1}{2}$.

✓ A check showing each answer is the wrong size.

2 Put them in order

ANSWER A · 3

i. The LCM of 6, 9, 4 and 12 is 36: $\frac{5}{6} = \frac{30}{36}$, $\frac{7}{9} = \frac{28}{36}$, $\frac{3}{4} = \frac{27}{36}$, $\frac{11}{12} = \frac{33}{36}$.

Descending: $\mathbf{\frac{11}{12}}, \mathbf{\frac{5}{6}}, \mathbf{\frac{7}{9}}, \mathbf{\frac{3}{4}}$.

ii. $\mathbf{\frac{7}{9}}$ **and** $\mathbf{\frac{3}{4}}$: $\frac{28}{36} - \frac{27}{36} = \mathbf{\frac{1}{36}}$ apart.

MARKING SCHEME

✓ All four with denominator 36.

✓ $\frac{11}{12}, \frac{5}{6}, \frac{7}{9}, \frac{3}{4}$.

✓ $\frac{7}{9}$ and $\frac{3}{4}$, $\frac{1}{36}$ apart.

3 The fraction with a sum

ANSWER A · 3

$\frac{3 \times k}{5 \times k}$ has $3 \times k + 5 \times k = 8 \times k$ on top and bottom together. $8 \times k = 64$, so $k = 8$.

The fraction is $\frac{3 \times 8}{5 \times 8} = \mathbf{\frac{24}{40}}$. Check: $24 + 40 = 64$ ✓

MARKING SCHEME

✓ Numerator and denominator add up to 8 times a number.

✓ That number is 8.

✓ $\frac{24}{40}$.

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4 In between

ANSWER A · 3

i. $\frac{1}{3} = \frac{4}{12}$ and $\frac{1}{2} = \frac{6}{12}$, so $\mathbf{\frac{5}{12}}$.

ii. With denominator 24: $\frac{1}{3} = \frac{8}{24}$ and $\frac{1}{2} = \frac{12}{24}$, so $\mathbf{\frac{9}{24}} = \mathbf{\frac{3}{8}}$, $\mathbf{\frac{10}{24}} = \mathbf{\frac{5}{12}}$, $\mathbf{\frac{11}{24}}$. Other answers are right if they lie between the two.

iii. **Yes.** Make the denominators bigger: multiply the top and bottom of both by 2, 3, 10 …, and there is always room for more fractions between the numerators.

MARKING SCHEME

✓ $\frac{5}{12}$.

✓ Three fractions between $\frac{1}{3}$ and $\frac{1}{2}$.

✓ Yes: a bigger common denominator always leaves room.

5 A field in the Tarai

ANSWER A · 4

i. $1\frac{1}{2} \times 20 = \frac{3}{2} \times 20 = \mathbf{30\ kattha}$.

ii. Paddy: $\frac{2}{3} \times 30 = \mathbf{20\ kattha}$. The rest is $30 - 20 = 10$ kattha. Lentils: $\frac{2}{5} \times 10 = \mathbf{4\ kattha}$.

iii. Vegetables: $10 - 4 = 6$ kattha, and $\frac{6}{20} = \mathbf{\frac{3}{10}}$ **of a bigha**.

MARKING SCHEME

✓ 30 kattha.

✓ 20 kattha of paddy.

✓ 4 kattha of lentils ($\frac{2}{5}$ of the rest, not of the field).

✓ $\frac{3}{10}$ of a bigha.

6 A rope cut twice

ANSWER A · 3

$5\frac{1}{4} - 1\frac{2}{3} - 2\frac{5}{6} = \frac{21}{4} - \frac{5}{3} - \frac{17}{6}$

The LCM of 4, 3 and 6 is 12: $\frac{63}{12} - \frac{20}{12} - \frac{34}{12} = \frac{9}{12} = \mathbf{\frac{3}{4}}$ **m**.

MARKING SCHEME

✓ Improper fractions (or wholes and parts apart).

✓ The common denominator 12.

✓ $\frac{3}{4}$ m.

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7 How many fit?

ANSWER A · 4

i. $1\frac{1}{2} \div \frac{3}{8} = \frac{3}{2} \times \frac{8}{3} =$ **4 bags**.

ii. Work backwards: the number is $9 \times \frac{2}{3} =$ **6**. Check: $6 \div \frac{2}{3} = 6 \times \frac{3}{2} = 9$ ✓

iii. **$12 \div \frac{3}{4}$** is bigger: dividing by a fraction less than 1 gives more than 12, multiplying by it gives less.

$12 \div \frac{3}{4} = 12 \times \frac{4}{3} = 16$ and $12 \times \frac{3}{4} = 9$.

MARKING SCHEME

✓ 4 bags.

✓ 6.

✓ $12 \div \frac{3}{4}$ is bigger, with a reason.

✓ 16 and 9.

8 Four digit cards

ANSWER HA · 3

i. Big numerators, small denominators: $\frac{4}{1} + \frac{3}{2} = 4 + 1\frac{1}{2} =$ **$5\frac{1}{2}$**.

ii. **$\frac{1}{3} + \frac{2}{4} = \frac{4}{12} + \frac{6}{12} = \frac{10}{12} = \frac{5}{6}$**. (The other good try, $\frac{1}{4} + \frac{2}{3} = \frac{11}{12}$, is a little bigger.)

iii. The small digits 1 and 2 go on **top** and the big digits 3 and 4 at the **bottom**. Then the bigger numerator, 2, goes over the bigger denominator, 4, so that it is cut into the smallest pieces.

MARKING SCHEME

✓ $5\frac{1}{2}$.

✓ $\frac{5}{6}$, from $\frac{1}{3} + \frac{2}{4}$.

✓ Small digits on top, the 2 over the 4.

9 Think: unit fractions

ANSWER HA · 4

i. **$\frac{1}{2} + \frac{1}{4}$** $= \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$

ii. **$\frac{1}{2} + \frac{1}{3}$** $= \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

iii. **$\frac{1}{3} + \frac{1}{4}$** $= \frac{4}{12} + \frac{3}{12}$, and **$\frac{1}{2} + \frac{1}{12}$** $= \frac{6}{12} + \frac{1}{12}$.

iv. $\frac{2}{5} - \frac{1}{3} = \frac{6}{15} - \frac{5}{15} = \frac{1}{15}$, so **$\frac{2}{5} = \frac{1}{3} + \frac{1}{15}$**. ($\frac{1}{5} + \frac{1}{5}$ is not allowed: the two must be different.)

MARKING SCHEME

✓ $\frac{1}{2} + \frac{1}{4}$.

✓ $\frac{1}{2} + \frac{1}{3}$.

✓ $\frac{1}{3} + \frac{1}{4}$ and $\frac{1}{2} + \frac{1}{12}$.

✓ $\frac{1}{3} + \frac{1}{15}$.

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See it at Science Playground

Exhibits and plants at the center, Bhaktapur, that go with this unit. Book a class visit at science-playground.com/booking.

- **Tangram Puzzle** (exhibit): A small triangle is 1/16 of the whole square and the middle-sized one is 1/8. Lay two small ones on the middle one: 2/16 = 1/8.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	0	4	20	7	**31**

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