nexamind EDUCATION

Name _____ Date _____

7.5 Making fraction calculations easier — worked answers

Use the structure of a calculation — cancelling, reordering and dividing before multiplying — to work with fractions efficiently. · 39 questions

A · Fluency — Choose the easy order.

1 Work out $1_4 + 1_2 + 3_4$

Answer: 3/2

Look for a pair that makes a simple total first, then add the third. The answer is 3/2.

2 Work out $2_5 + 1_5 + 2_5$

Answer: 1

Look for a pair that makes a simple total first, then add the third. The answer is 1.

3 Work out $1_3 + 1_6 + 1_2$

Answer: 1

Look for a pair that makes a simple total first, then add the third. The answer is 1.

4 Work out $3_8 + 1_8 + 1_2$

Answer: 1

Look for a pair that makes a simple total first, then add the third. The answer is 1.

5 Work out $5_6 + 1_6 + 1_3$

Answer: 4/3

Look for a pair that makes a simple total first, then add the third. The answer is 4/3.

6 Work out $2_9 + 1_9 + 1_3$

Answer: 2/3

Look for a pair that makes a simple total first, then add the third. The answer is 2/3.

7 Work out 1_2 of 48

Answer: 24

Divide first, then multiply — the numbers stay small: 48 ÷ 2 = 24, then × 1 = 24.

8 Work out 1_4 of 36

Answer: 9

Divide first, then multiply — the numbers stay small: 36 ÷ 4 = 9, then × 1 = 9.

9 Work out 3_4 of 48

Answer: 36

Divide first, then multiply — the numbers stay small: 48 ÷ 4 = 12, then × 3 = 36.

10 Work out ²$_3$ of 42

Answer: 28

Divide first, then multiply — the numbers stay small: 42 ÷ 3 = 14, then × 2 = 28.

11 Work out ⁵$_6$ of 36

Answer: 30

Divide first, then multiply — the numbers stay small: 36 ÷ 6 = 6, then × 5 = 30.

12 Work out ³$_5$ of 45

Answer: 27

Divide first, then multiply — the numbers stay small: 45 ÷ 5 = 9, then × 3 = 27.

13 Work out ⁷$_{10}$ of 60

Answer: 42

Divide first, then multiply — the numbers stay small: 60 ÷ 10 = 6, then × 7 = 42.

14 Work out ²$_7$ of 49

Answer: 14

Divide first, then multiply — the numbers stay small: 49 ÷ 7 = 7, then × 2 = 14.

15 Work out ³$_4$ × ⁴$_3$

Answer: 1

They are reciprocals of each other, so the answer is 1 without any working.

16 Work out ²$_5$ × ⁵$_2$

Answer: 1

They are reciprocals of each other, so the answer is 1 without any working.

17 Work out ⁷$_8$ × ⁸$_7$

Answer: 1

They are reciprocals of each other, so the answer is 1 without any working.

18 Work out ⁵$_9$ × ⁹$_5$

Answer: 1

They are reciprocals of each other, so the answer is 1 without any working.

B · Reasoning — Which reorderings are allowed.

19 Why is it worth cancelling before multiplying?

- ☐ It is required
- ☐ The numbers stay small and the answer arrives simplified
- ☐ It changes the answer
- ☐ It is faster to multiply big numbers

Answer: The numbers stay small and the answer arrives simplified

24/36 needs simplifying afterwards; cancelling first gives 2/3 straight away.

20 For 3/4 of 48, which order is easier?

- ☐ 48 × 3 then ÷ 4
- ☐ 48 ÷ 4 then × 3
- ☐ They are equally hard
- ☐ Neither works

Answer: 48 ÷ 4 then × 3

12 × 3 = 36 is easier than 144 ÷ 4. Both are correct — one is kinder.

21 Why does 5/8 × 8/5 = 1 without any calculation?

- ☐ Because both are less than 1
- ☐ They are reciprocals of each other
- ☐ Because 5 + 8 = 13
- ☐ It does not equal 1

Answer: They are reciprocals of each other

The numerators and denominators cancel completely.

22 In 1/4 + 1/2 + 3/4, which pair should you add first?

- ☐ 1/4 and 1/2
- ☐ 1/4 and 3/4
- ☐ 1/2 and 3/4
- ☐ It makes no difference to the ease

Answer: 1/4 and 3/4

They make exactly 1, so the sum becomes 1 + 1/2 = 1 1/2 in one step.

23 Does changing the order of an addition change the answer?

- ☐ Yes
- ☐ No

Answer: No

Addition is commutative, so you may reorder to make the work easier.

24 Does changing the order of a subtraction change the answer?

- ☐ Yes
- ☐ No

Answer: Yes

3/4 − 1/4 is not the same as 1/4 − 3/4. Only addition and multiplication can be freely reordered.

25 What is the best first step for 2/3 × 9?

- ☐ Multiply 2 × 9 then divide by 3
- ☐ Divide 9 by 3 then multiply by 2
- ☐ Find a common denominator
- ☐ Convert to a decimal

Answer: Divide 9 by 3 then multiply by 2

9 ÷ 3 = 3, then 3 × 2 = 6. No large numbers appear at all.

C · Challenge — Cancelling and pairing.

26 Work out ¹$_3$ + ²$_3$ + ⁵$_6$

Answer: 11/6

1/3 + 2/3 = 1 first, then 1 + 5/6 = 11/6, or 1 5/6.

27 Work out 5/6 of 72 by dividing first.

Answer: 60

72 ÷ 6 = 12, then 12 × 5 = 60.

28 Work out ⁴$_9$ × ³$_8$ by cancelling first.

Answer: 1/6

4 and 8 share 4; 3 and 9 share 3. That leaves 1/3 × 1/2 = 1/6.

29 Work out 7/10 of 120 by dividing first.

Answer: 84

120 ÷ 10 = 12, then 12 × 7 = 84.

30 Work out ²$_{7}$ × ⁷$_{2}$

Answer: 1

They are reciprocals, so the answer is 1.

31 Work out 3/8 of 64 in the easiest order.

Answer: 24

64 ÷ 8 = 8, then 8 × 3 = 24.

D · Word problems — Fractions of quantities, done neatly.

32 A class of 36 has 5/6 present. How many are present?

Answer: 30

36 ÷ 6 = 6, then 6 × 5 = 30.

33 A 90-minute film is 2/3 over. How many minutes have gone?

Answer: 60

90 ÷ 3 = 30, then 30 × 2 = 60.

34 A jug holds ¹$_{4}$ litre, another ¹$_{2}$ litre and a third ³$_{4}$ litre. What is the total, in litres?

Answer: 3/2

1/4 + 3/4 = 1 first, then 1 + 1/2 = 3/2 litre, or 1 1/2 litres.

35 A farm has 84 animals and 3/7 are sheep. How many sheep?

Answer: 36

84 ÷ 7 = 12, then 12 × 3 = 36.

36 A book has 240 pages and 5/8 has been read. How many pages?

Answer: 150

240 ÷ 8 = 30, then 30 × 5 = 150.

37 A shop sells 3/5 of its 75 loaves. How many loaves is that?

Answer: 45

75 ÷ 5 = 15, then 15 × 3 = 45.

38 A journey of 210 km is 4/7 complete. How many km is that?

Answer: 120

210 ÷ 7 = 30, then 30 × 4 = 120.

39 A tank of 96 litres is 7/8 full. How many litres?

Answer: 84

96 ÷ 8 = 12, then 12 × 7 = 84.