



1.1 Arithmetic

Section 1 - Mathematical Symbols of Equality and Inequality

S y m b o l	Meaning	S y m b o l	Meaning
=	Equal to	<	Less than
≤	Less than or equal to	>	Greater than
≥	Greater than or equal to	≠	Not equal to

Section 2 - Decimals

Core Rules

- Adding / Subtracting: Line up the decimal points, then calculate normally.
- Multiplying: Multiply as whole numbers; count total decimal places across both numbers and insert the point.
- Dividing: Multiply BOTH numbers by 10, 100 or 1000 until the divisor is a whole number, then divide.

Worked Example - Decimals

a	LINE UP: 7.6 + 19.0	7.6 + 19: write 19 as 19.0 so decimal points align	= 26.6
b	3.40 - 0.24	Write 3.4 as 3.40, subtract right to left.	= 3.16
c	72 x 21 = 1512 -> 3 d.p. -> 1.512	7.2 has 1 d.p. + 0.21 has 2 d.p. = 3 total.	= 1.512
d	x10 both: 8.4 / 2	0.2 has 1 d.p. - multiply both by 10.	= 4.2
e	x1000 both: 3600 / 4	0.004 has 3 d.p. - multiply both by 1000.	= 900

Exercise 1.1A - All 40 Answers

1. 7.6+0.31 = 7.91	2. 15+7.22 = 22.22	3. 7.004+0.368 = 7.372	4. 0.06+0.006 = 0.066
5. 4.2+42+420 = 466.2	6. 3.84-2.62 = 1.22	7. 11.4-9.73 = 1.67	8. 4.61-3 = 1.61
9. 17-0.37 = 16.63	10. 8.7+19.2-3.8 = 24.1 27.9-3.8	11. 25-7.8+9.5 = 26.7 17.2+9.5	12. 3.6-8.74+9 = 3.86 -5.14+9

13. $20.4 - 20.399$ = 0.001	14. 2.6×0.6 = 1.56 <i>26x6=156; 2d.p.</i>	15. 0.72×0.04 = 0.0288 <i>72x4=288; 4d.p.</i>	16. 27.2×0.08 = 2.176 <i>272x8=2176</i>
17. 0.1×0.2 = 0.02 <i>2 d.p.</i>	18. $(0.01)^2$ = 0.0001 <i>4 d.p.</i>	19. 2.1×3.6 = 7.56 <i>21x36=756</i>	20. 2.31×0.34 = 0.7854 <i>231x34=7854</i>
21. 0.36×1000 = 360 <i>3 places right</i>	22. 0.34×100000 = 34 000	23. $3.6 / 0.2$ = 18 <i>x10: 36/2</i>	24. $0.592 / 0.8$ = 0.74 <i>x10: 5.92/8</i>
25. $0.1404 / 0.06$ = 2.34 <i>x100: 14.04/6</i>	26. $3.24 / 0.002$ = 1620 <i>x1000: 3240/2</i>	27. $0.968 / 0.11$ = 8.8 <i>x100: 96.8/11</i>	28. $600 / 0.5$ = 1200 <i>x10: 6000/5</i>
29. $0.007 / 4$ = 0.00175	30. $2640 / 200$ = 13.2	31. $1100 / 5.5$ = 200 <i>x10: 11000/55</i>	32. $(11 + 2.4) \times 0.06$ = 0.804 <i>13.4x0.06</i>
33. $(0.4)^2 / 0.2$ = 0.8 <i>0.16/0.2</i>	34. $77 / 1000$ = 0.077	35. $(0.3)^2 / 100$ = 0.0009 <i>0.09/100</i>	36. $(0.1)^4 / 0.01$ = 0.0001
37. $(92 \times 4.6) / 2.3$ = 184 <i>423.2/2.3</i>	38. $(180 \times 4) / 36$ = 20 <i>720/36</i>	39. $(0.55 \times 0.81) / 4.5$ = 0.099 <i>0.4455/4.5</i>	40. $(63 \times 600 \times 0.2) / (360 \times 7)$ = 3 <i>7560/2520</i>

Exercise 1.1B - Word Problems

Question 1

Eric's temperature was 100.4 F. After medicine it dropped by 1.7 F.

Step 1: $100.4 - 1.7 = 98.7$

Dropped by = subtract

ANSWER: Answer: 98.7 F

Question 2

Bowl of rice = 400.8 g. Empty bowl = 357.4 g. Find mass of rice.

Step 1: $400.8 - 357.4 = 43.4$ g

Total - Empty bowl

ANSWER: Answer: 43.4 g

Question 3

Debbie had \$5.80, spent \$3.25.

Step 1: $\$5.80 - \$3.25 = \$2.55$

ANSWER: Answer: \$2.55

Question 4

Sam: 2.5 L juice. Pours 3 glasses of 0.375 L each. How much remains?

Step 1: $3 \times 0.375 = 1.125$ L poured out

Multiply first

Step 2: $2.5 - 1.125 = 1.375$ L

Subtract from total

ANSWER: Answer: 1.375 litres

Question 5

3 friends earn \$9.25 each, buy \$24.99 comic, split change equally.

Step 1: $3 \times \$9.25 = \27.75 total

Step 2: $\$27.75 - \$24.99 = \$2.76$ change

Step 3: $\$2.76 / 3 = \0.92 each

ANSWER: Answer: \$0.92 each

Question 6

Object on Earth weighs 2.64x its Mars weight. Mars = 5 N.

Step 1: $5 \times 2.64 = 13.2$ N

Multiply Mars weight by factor

ANSWER: Answer: 13.2 newtons

Question 7

Average \$4.26 each, total = \$51.12. How many people?

Step 1: $\$51.12 / \$4.26 = 12$

Total / average

ANSWER: Answer: 12 people

Question 8

Relay times: 45.7, 43.1, 48.2, 50.4 sec.

Step 1: $45.7+43.1+48.2+50.4 = 187.4$

Add all four

Step 2: $187.4 / 4 = 46.85$ sec

Divide by 4

ANSWER: Answer: 46.85 seconds

Question 9

11 friends share a bill of 138.05 pounds equally.

Step 1: $138.05 / 11 = 12.55$

ANSWER: Answer: 12.55 pounds each

Question 10

40 calculators at \$8.20 each + some at \$2.95. Total = \$387.

Step 1: $40 \times \$8.20 = \328

Expensive calculators

Step 2: $\$387 - \$328 = \$59$ remaining

Step 3: $\$59 / \$2.95 = 20$

Divide remaining by cheap price

ANSWER: Answer: 20 cheap calculators



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Section 3 - Fractions

Adding and Subtracting Fractions

- Fractions must share a COMMON DENOMINATOR before adding or subtracting.
- Find the Lowest Common Multiple (LCM) of the two denominators.
- Convert both fractions to the common denominator.
- For mixed numbers: convert to improper fractions first (whole x denom + numer).
- After calculating, simplify to lowest terms.

Multiplying Fractions

- Multiply numerators together, then multiply denominators together.
- Cancel common factors before multiplying to keep numbers smaller.

Dividing Fractions - KCF Method

- KEEP the first fraction unchanged.
- CHANGE the division sign to multiplication.
- FLIP the second fraction to find its reciprocal.
- Then multiply as normal.

TIP: BIDMAS: Brackets first, then Indices, then Division and Multiplication (left to right), then Addition and Subtraction (left to right).

Worked Example - Adding Fractions

1 WRITE THE FRACTIONS

$$\frac{3}{4} + \frac{2}{5}$$

2 FIND LCM OF 4 AND 5

Multiples of 4: 4, 8, 12, 16, 20, 24 ...

Multiples of 5: 5, 10, 15, 20, 25, 30 ...

LCM = 20

3 CONVERT BOTH TO DENOMINATOR 20

$$\frac{3}{4} = \frac{3 \times 5}{4 \times 5} = \frac{15}{20} \quad \frac{2}{5} = \frac{2 \times 4}{5 \times 4} = \frac{8}{20}$$

Multiply top AND bottom by the same number.

4

ADD THE NUMERATORS

$$\frac{15}{20} + \frac{8}{20} = \frac{23}{20}$$

5

CONVERT TO MIXED NUMBER

$$23 / 20 = 1 \text{ remainder } 3$$

ANSWER: $1 \frac{3}{20}$

Worked Example - Subtracting Mixed Numbers

1

WRITE THE EXPRESSION

$$2 \frac{3}{8} - 1 \frac{5}{12}$$

2

CONVERT TO IMPROPER FRACTIONS

$$2 \frac{3}{8} = \frac{19}{8} \quad 1 \frac{5}{12} = \frac{17}{12}$$

(whole x denom) + numer: $2 \times 8 + 3 = 19$ and $1 \times 12 + 5 = 17$

3

FIND LCM OF 8 AND 12

Multiples of 8: 8, 16, 24, 32, 40, 48 ...

Multiples of 12: 12, 24, 36, 48, 60, 72 ...

LCM = 24

4

CONVERT TO DENOMINATOR 24

$$\frac{19}{8} = \frac{57}{24} \text{ (x3)} \quad \frac{17}{12} = \frac{34}{24} \text{ (x2)}$$

5

SUBTRACT

$$\frac{57}{24} - \frac{34}{24} = \frac{23}{24}$$

23 is prime - already simplest form.

ANSWER: $\frac{23}{24}$

Worked Example - Multiplying Fractions

1

MULTIPLY NUMERATORS AND DENOMINATORS

$$\frac{2}{5} \times \frac{6}{7} = \frac{2 \times 6}{5 \times 7} = \frac{12}{35}$$

$2 \times 6 = 12$ and $5 \times 7 = 35$

2

CHECK: GCF(12,35) = 1 - ALREADY SIMPLEST FORM

ANSWER: $\frac{12}{35}$

Worked Example - Dividing Fractions (KCF)

1 CONVERT MIXED NUMBER

$$2 \frac{2}{5} = \frac{12}{5}$$

$$2 \times 5 + 2 = 12$$

2 KCF - FLIP THE SECOND FRACTION

$$\frac{12}{5} \text{ div } \frac{6}{1} \text{ becomes } \frac{12}{5} \times \frac{1}{6}$$

Reciprocal of $6/1$ is $1/6$

3 CANCEL AND MULTIPLY

$$\frac{12}{5} \times \frac{1}{6} = \frac{2}{5}$$

12 and 6 share factor 6: $12/6=2$, $6/6=1$. Result: $2/5$

ANSWER: $\frac{2}{5}$

Worked Example - BIDMAS with Fractions

1 WRITE EXPRESSION

$$1 \frac{2}{3} - \frac{1}{5} \times 4 \frac{1}{2}$$

2 BIDMAS: MULTIPLICATION FIRST

$$\frac{1}{5} \times 4 \frac{1}{2} = \frac{1}{5} \times \frac{9}{2} = \frac{9}{10}$$

4 and $1/2 = 9/2$. $1 \times 9 = 9$, $5 \times 2 = 10$.

3 CONVERT $1(2/3)$

$$1 \frac{2}{3} = \frac{5}{3}$$

$$1 \times 3 + 2 = 5$$

4 LCM(3,10) = 30

$$\frac{5}{3} = \frac{50}{30} \quad \frac{9}{10} = \frac{27}{30}$$

5 SUBTRACT

$$\frac{50}{30} - \frac{27}{30} = \frac{23}{30}$$

ANSWER: $\frac{23}{30}$



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Section 3 - Exercise 1.1C - All Questions with Full Working

Q1. $\frac{3}{4} + \frac{4}{5}$

1 QUESTION

$$\frac{3}{4} + \frac{4}{5}$$

2 FIND THE LCM OF THE DENOMINATORS

Multiples of 4: 4, 8, 12, 16, 20, 24 ...

Multiples of 5: 5, 10, 15, 20, 25, 30 ...

LCM = 20

3 CONVERT BOTH FRACTIONS TO THE COMMON DENOMINATOR

$$\frac{3}{4} = \frac{3 \times 5}{4 \times 5} = \frac{15}{20} \quad \frac{4}{5} = \frac{4 \times 4}{5 \times 4} = \frac{16}{20}$$

Multiply top AND bottom by the same number.

4 ADD THE NUMERATORS

$$\frac{15}{20} + \frac{16}{20} = \frac{31}{20}$$

5 CONVERT TO MIXED NUMBER

$$\frac{31}{20} = 1 \frac{11}{20}$$

$31 / 20 = 1$ remainder 11

ANSWER: $1 \frac{11}{20}$

Q2. $\frac{1}{3} + \frac{1}{8}$

1 QUESTION

$$\frac{1}{3} + \frac{1}{8}$$

2 FIND THE LCM OF THE DENOMINATORS

Multiples of 3: 3, 6, 9, 12, 15, 18 ...

Multiples of 8: 8, 16, 24, 32, 40, 48 ...

LCM = 24

3

CONVERT BOTH FRACTIONS TO THE COMMON DENOMINATOR

$$\frac{1}{3} = \frac{1 \times 8}{3 \times 8} = \frac{8}{24} \quad \frac{1}{8} = \frac{1 \times 3}{8 \times 3} = \frac{3}{24}$$

Multiply top AND bottom by the same number.

4

ADD THE NUMERATORS

$$\frac{8}{24} + \frac{3}{24} = \frac{11}{24}$$

ANSWER: $\frac{11}{24}$ Q3. $\frac{5}{6} + \frac{6}{9}$

1

QUESTION

$$\frac{5}{6} + \frac{6}{9}$$

2

FIND THE LCM OF THE DENOMINATORS

Multiples of 6: 6, 12, 18, 24, 30, 36 ...

Multiples of 9: 9, 18, 27, 36, 45, 54 ...

LCM = 18

3

CONVERT BOTH FRACTIONS TO THE COMMON DENOMINATOR

$$\frac{5}{6} = \frac{5 \times 3}{6 \times 3} = \frac{15}{18} \quad \frac{6}{9} = \frac{6 \times 2}{9 \times 2} = \frac{12}{18}$$

Multiply top AND bottom by the same number.

4

ADD THE NUMERATORS

$$\frac{15}{18} + \frac{12}{18} = \frac{27}{18}$$

5

SIMPLIFY

$$\frac{27}{18} = \frac{27:9}{18:9} = \frac{3}{2}$$

GCF(27,18) = 9

6

CONVERT TO MIXED NUMBER

$$\frac{3}{2} = 1 \frac{1}{2}$$

 $3 / 2 = 1$ remainder 1ANSWER: $1 \frac{1}{2}$ Q4. $\frac{3}{4} - \frac{1}{3}$

1**QUESTION**

$$\frac{3}{4} - \frac{1}{3}$$

2**FIND THE LCM OF THE DENOMINATORS**

Multiples of 4: 4, 8, 12, 16, 20, 24 ...

Multiples of 3: 3, 6, 9, 12, 15, 18 ...

LCM = 12**3****CONVERT BOTH FRACTIONS TO THE COMMON DENOMINATOR**

$$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12} \quad \frac{1}{3} = \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$$

Multiply top AND bottom by the same number.

4**SUBTRACT THE NUMERATORS**

$$\frac{9}{12} - \frac{4}{12} = \frac{5}{12}$$

ANSWER: $\frac{5}{12}$



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Complete Notes - Step-by-Step Working - All Questions Answered

Q5. $\frac{3}{5} - \frac{1}{3}$

1 QUESTION

$$\frac{3}{5} - \frac{1}{3}$$

2 FIND THE LCM OF THE DENOMINATORS

Multiples of 5: 5, 10, 15, 20, 25, 30 ...

Multiples of 3: 3, 6, 9, 12, 15, 18 ...

LCM = 15

3 CONVERT BOTH FRACTIONS TO THE COMMON DENOMINATOR

$$\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15} \quad \frac{1}{3} = \frac{1 \times 5}{3 \times 5} = \frac{5}{15}$$

Multiply top AND bottom by the same number.

4 SUBTRACT THE NUMERATORS

$$\frac{9}{15} - \frac{5}{15} = \frac{4}{15}$$

ANSWER: $\frac{4}{15}$

Q6. $\frac{1}{2} - \frac{2}{5}$

1 QUESTION

$$\frac{1}{2} - \frac{2}{5}$$

2 FIND THE LCM OF THE DENOMINATORS

Multiples of 2: 2, 4, 6, 8, 10, 12 ...

Multiples of 5: 5, 10, 15, 20, 25, 30 ...

LCM = 10

3 CONVERT BOTH FRACTIONS TO THE COMMON DENOMINATOR

$$\frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10} \quad \frac{2}{5} = \frac{2 \times 2}{5 \times 2} = \frac{4}{10}$$

Multiply top AND bottom by the same number.

4 SUBTRACT THE NUMERATORS

$$\frac{5}{10} - \frac{4}{10} = \frac{1}{10}$$

ANSWER: $\frac{1}{10}$

Q7. $\frac{2}{3} \times \frac{4}{5}$

1 QUESTION

$$\frac{2}{3} \times \frac{4}{5}$$

2 MULTIPLY NUMERATORS TOGETHER, THEN DENOMINATORS

$$\frac{2}{3} \times \frac{4}{5} = \frac{2 \times 4}{3 \times 5} = \frac{8}{15}$$

$2 \times 4 = 8$ and $3 \times 5 = 15$

ANSWER: $\frac{8}{15}$

Q8. $\frac{1}{7} \times \frac{5}{6}$

1 QUESTION

$$\frac{1}{7} \times \frac{5}{6}$$

2 MULTIPLY NUMERATORS TOGETHER, THEN DENOMINATORS

$$\frac{1}{7} \times \frac{5}{6} = \frac{1 \times 5}{7 \times 6} = \frac{5}{42}$$

$1 \times 5 = 5$ and $7 \times 6 = 42$

ANSWER: $\frac{5}{42}$



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Complete Notes - Step-by-Step Working - All Questions Answered

Q9. $\frac{5}{8} \times \frac{12}{13}$

1 QUESTION

$$\frac{5}{8} \times \frac{12}{13}$$

2 MULTIPLY NUMERATORS TOGETHER, THEN DENOMINATORS

$$\frac{5}{8} \times \frac{12}{13} = \frac{5 \times 12}{8 \times 13} = \frac{60}{104}$$

 $5 \times 12 = 60$ and $8 \times 13 = 104$

3 SIMPLIFY

$$\frac{60}{104} = \frac{60 \div 4}{104 \div 4} = \frac{15}{26}$$

 $GCF(60, 104) = 4$

ANSWER: $\frac{15}{26}$

Q10. $\frac{1}{3} \div \frac{4}{5}$

1 QUESTION

$$\frac{1}{3} \div \frac{4}{5}$$

2 KCF - KEEP, CHANGE, FLIP THE SECOND FRACTION

$$\frac{1}{3} \div \frac{4}{5} \text{ becomes } \frac{1}{3} \times \frac{5}{4}$$

Reciprocal of $\frac{4}{5}$ is $\frac{5}{4}$

3 MULTIPLY

$$\frac{1}{3} \times \frac{5}{4} = \frac{1 \times 5}{3 \times 4} = \frac{5}{12}$$

 $1 \times 5 = 5$ and $3 \times 4 = 12$

ANSWER: $\frac{5}{12}$

Q11. $\frac{3}{4} \div \frac{1}{6}$

1 QUESTION

$$\frac{3}{4} \text{ div } \frac{1}{6}$$

2 KCF - KEEP, CHANGE, FLIP THE SECOND FRACTION

$$\frac{3}{4} \text{ div } \frac{1}{6} \text{ becomes } \frac{3}{4} \times \frac{6}{1}$$

Reciprocal of 1/6 is 6/1

3 MULTIPLY

$$\frac{3}{4} \times \frac{6}{1} = \frac{3 \times 6}{4 \times 1} = \frac{18}{4}$$

3x6=18 and 4x1=4

4 SIMPLIFY

$$\frac{18}{4} = \frac{18:2}{4:2} = \frac{9}{2}$$

GCF(18,4) = 2

5 CONVERT TO MIXED NUMBER

$$\frac{9}{2} = 4 \frac{1}{2}$$

9 / 2 = 4 remainder 1

ANSWER: 4 $\frac{1}{2}$

Q12. 5/6 div 1/2**1 QUESTION**

$$\frac{5}{6} \text{ div } \frac{1}{2}$$

2 KCF - KEEP, CHANGE, FLIP THE SECOND FRACTION

$$\frac{5}{6} \text{ div } \frac{1}{2} \text{ becomes } \frac{5}{6} \times \frac{2}{1}$$

Reciprocal of 1/2 is 2/1

3 MULTIPLY

$$\frac{5}{6} \times \frac{2}{1} = \frac{5 \times 2}{6 \times 1} = \frac{10}{6}$$

5x2=10 and 6x1=6

4 SIMPLIFY

$$\frac{10}{6} = \frac{10:2}{6:2} = \frac{5}{3}$$

GCF(10,6) = 2

5

CONVERT TO MIXED NUMBER

$$\frac{5}{3} = 1 \frac{2}{3}$$

$5 \div 3 = 1$ remainder 2

ANSWER: $1 \frac{2}{3}$



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Complete Notes - Step-by-Step Working - All Questions Answered

Q13. $\frac{3}{8} + \frac{1}{5}$

1 QUESTION

$$\frac{3}{8} + \frac{1}{5}$$

2 FIND THE LCM OF THE DENOMINATORS

Multiples of 8: 8, 16, 24, 32, 40, 48 ...

Multiples of 5: 5, 10, 15, 20, 25, 30 ...

LCM = 40

3 CONVERT BOTH FRACTIONS TO THE COMMON DENOMINATOR

$$\frac{3}{8} = \frac{3 \times 5}{8 \times 5} = \frac{15}{40} \quad \frac{1}{5} = \frac{1 \times 8}{5 \times 8} = \frac{8}{40}$$

Multiply top AND bottom by the same number.

4 ADD THE NUMERATORS

$$\frac{15}{40} + \frac{8}{40} = \frac{23}{40}$$

ANSWER: $\frac{23}{40}$

Q14. $\frac{3}{8} \times \frac{1}{5}$

1 QUESTION

$$\frac{3}{8} \times \frac{1}{5}$$

2 MULTIPLY NUMERATORS TOGETHER, THEN DENOMINATORS

$$\frac{3}{8} \times \frac{1}{5} = \frac{3 \times 1}{8 \times 5} = \frac{3}{40}$$

 $3 \times 1 = 3$ and $8 \times 5 = 40$ **ANSWER: $\frac{3}{40}$**

Q15. $\frac{3}{8} \div \frac{1}{5}$

1

QUESTION

$$\frac{3}{8} \text{ div } \frac{1}{5}$$

2

KCF - KEEP, CHANGE, FLIP THE SECOND FRACTION

$$\frac{3}{8} \text{ div } \frac{1}{5} \text{ becomes } \frac{3}{8} \times \frac{5}{1}$$

Reciprocal of $1/5$ is $5/1$ **3**

MULTIPLY

$$\frac{3}{8} \times \frac{5}{1} = \frac{3 \times 5}{8 \times 1} = \frac{15}{8}$$

 $3 \times 5 = 15$ and $8 \times 1 = 8$ **4**

CONVERT TO MIXED NUMBER

$$\frac{15}{8} = 1 \frac{7}{8}$$

 $15 / 8 = 1$ remainder 7 **ANSWER: $1 \frac{7}{8}$**

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Complete Notes - Step-by-Step Working - All Questions Answered

Q16. $1\frac{3}{4} - \frac{2}{3}$

1 QUESTION

$$1\frac{3}{4} - \frac{2}{3}$$

2 CONVERT MIXED NUMBERS TO IMPROPER FRACTIONS

$$1\frac{3}{4} = \frac{7}{4}$$

Formula: (whole x denom) + numer

3 FIND THE LCM OF THE DENOMINATORS

Multiples of 4: 4, 8, 12, 16, 20, 24 ...

Multiples of 3: 3, 6, 9, 12, 15, 18 ...

LCM = 12

4 CONVERT BOTH FRACTIONS TO THE COMMON DENOMINATOR

$$\frac{7}{4} = \frac{7 \times 3}{4 \times 3} = \frac{21}{12} \quad \frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

Multiply top AND bottom by the same number.

5 SUBTRACT THE NUMERATORS

$$\frac{21}{12} - \frac{8}{12} = \frac{13}{12}$$

6 CONVERT TO MIXED NUMBER

$$\frac{13}{12} = 1\frac{1}{12}$$

$13 / 12 = 1$ remainder 1

ANSWER: $1\frac{1}{12}$

Q17. $1\frac{3}{4} \times \frac{2}{3}$

1 QUESTION

$$1\frac{3}{4} \times \frac{2}{3}$$

2 CONVERT MIXED NUMBERS

$$1\frac{3}{4} = \frac{7}{4}$$

3**MULTIPLY NUMERATORS TOGETHER, THEN DENOMINATORS**

$$\frac{7}{4} \times \frac{2}{3} = \frac{7 \times 2}{4 \times 3} = \frac{14}{12}$$

7x2=14 and 4x3=12

4**SIMPLIFY**

$$\frac{14}{12} = \frac{14:2}{12:2} = \frac{7}{6}$$

GCF(14,12) = 2

5**CONVERT TO MIXED NUMBER**

$$\frac{7}{6} = 1 \frac{1}{6}$$

7 / 6 = 1 remainder 1

ANSWER: 1 $\frac{1}{6}$ **Q18. 1(3/4) div 2/3****1****QUESTION**

$$1 \frac{3}{4} \text{ div } \frac{2}{3}$$

2**CONVERT MIXED NUMBERS**

$$1 \frac{3}{4} = \frac{7}{4}$$

3**KCF - KEEP, CHANGE, FLIP THE SECOND FRACTION**

$$\frac{7}{4} \text{ div } \frac{2}{3} \text{ becomes } \frac{7}{4} \times \frac{3}{2}$$

Reciprocal of 2/3 is 3/2

4**MULTIPLY**

$$\frac{7}{4} \times \frac{3}{2} = \frac{7 \times 3}{4 \times 2} = \frac{21}{8}$$

7x3=21 and 4x2=8

5**CONVERT TO MIXED NUMBER**

$$\frac{21}{8} = 2 \frac{5}{8}$$

21 / 8 = 2 remainder 5

ANSWER: 2 $\frac{5}{8}$



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Complete Notes - Step-by-Step Working - All Questions Answered

Q19. $3\frac{1}{2} + 2\frac{3}{5}$

1 QUESTION

$$3\frac{1}{2} + 2\frac{3}{5}$$

2 CONVERT MIXED NUMBERS TO IMPROPER FRACTIONS

$$3\frac{1}{2} = \frac{7}{2} \quad 2\frac{3}{5} = \frac{13}{5}$$

Formula: (whole x denom) + numer

3 FIND THE LCM OF THE DENOMINATORS

Multiples of 2: 2, 4, 6, 8, 10, 12 ...

Multiples of 5: 5, 10, 15, 20, 25, 30 ...

LCM = 10

4 CONVERT BOTH FRACTIONS TO THE COMMON DENOMINATOR

$$\frac{7}{2} = \frac{7 \times 5}{2 \times 5} = \frac{35}{10} \quad \frac{13}{5} = \frac{13 \times 2}{5 \times 2} = \frac{26}{10}$$

Multiply top AND bottom by the same number.

5 ADD THE NUMERATORS

$$\frac{35}{10} + \frac{26}{10} = \frac{61}{10}$$

6 CONVERT TO MIXED NUMBER

$$\frac{61}{10} = 6\frac{1}{10}$$

 $61 \div 10 = 6$ remainder 1**ANSWER: $6\frac{1}{10}$**

Q20. $3\frac{1}{2} \times 2\frac{3}{5}$

1 QUESTION

$$3\frac{1}{2} \times 2\frac{3}{5}$$

2 CONVERT MIXED NUMBERS

$$3\frac{1}{2} = \frac{7}{2} \quad 2\frac{3}{5} = \frac{13}{5}$$

3**MULTIPLY NUMERATORS TOGETHER, THEN DENOMINATORS**

$$\frac{7}{2} \times \frac{13}{5} = \frac{7 \times 13}{2 \times 5} = \frac{91}{10}$$

7x13=91 and 2x5=10

4**CONVERT TO MIXED NUMBER**

$$\frac{91}{10} = 9 \frac{1}{10}$$

91 / 10 = 9 remainder 1

ANSWER: $9 \frac{1}{10}$ **Q21. $3(1/2) \text{ div } 2(3/5)$** **1****QUESTION**

$$3 \frac{1}{2} \text{ div } 2 \frac{3}{5}$$

2**CONVERT MIXED NUMBERS**

$$3 \frac{1}{2} = \frac{7}{2} \quad 2 \frac{3}{5} = \frac{13}{5}$$

3**KCF - KEEP, CHANGE, FLIP THE SECOND FRACTION**

$$\frac{7}{2} \text{ div } \frac{13}{5} \text{ becomes } \frac{7}{2} \times \frac{5}{13}$$

Reciprocal of 13/5 is 5/13

4**MULTIPLY**

$$\frac{7}{2} \times \frac{5}{13} = \frac{7 \times 5}{2 \times 13} = \frac{35}{26}$$

7x5=35 and 2x13=26

5**CONVERT TO MIXED NUMBER**

$$\frac{35}{26} = 1 \frac{9}{26}$$

35 / 26 = 1 remainder 9

ANSWER: $1 \frac{9}{26}$

1.1 Arithmetic

Complete Notes - Step-by-Step Working - All Questions Answered

Q22. $(\frac{3}{4} - \frac{2}{3}) \div \frac{3}{4}$

1 SOLVE THE BRACKET FIRST: $\frac{3}{4} - \frac{2}{3}$

Multiples of 4: 4, 8, 12, 16, 20, 24 ...

Multiples of 3: 3, 6, 9, 12, 15, 18 ...

LCM = 12

2 CONVERT TO COMMON DENOMINATOR

$$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12} \quad \frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

3 SUBTRACT

$$\frac{9}{12} - \frac{8}{12} = \frac{1}{12}$$

4 DIVIDE BRACKET RESULT BY $\frac{3}{4}$ - USE KCF

$$\frac{1}{12} \div \frac{3}{4} \text{ becomes } \frac{1}{12} \times \frac{4}{3}$$

Flip $\frac{3}{4}$ to get $\frac{4}{3}$

5 MULTIPLY AND SIMPLIFY

$$\frac{1}{12} \times \frac{4}{3} = \frac{4}{36} = \frac{1}{9}$$

ANSWER: $\frac{1}{9}$

Q23. $(\frac{3}{5} + \frac{1}{3}) \times \frac{5}{7}$

1 SOLVE THE BRACKET FIRST: $\frac{3}{5} + \frac{1}{3}$

Multiples of 5: 5, 10, 15, 20, 25, 30 ...

Multiples of 3: 3, 6, 9, 12, 15, 18 ...

LCM = 15

2 CONVERT TO COMMON DENOMINATOR

$$\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15} \quad \frac{1}{3} = \frac{1 \times 5}{3 \times 5} = \frac{5}{15}$$

3 ADD

$$\frac{9}{15} + \frac{5}{15} = \frac{14}{15}$$

4

MULTIPLY BY 5/7

$$\frac{14}{15} \times \frac{5}{7} = \frac{14 \times 5}{15 \times 7} = \frac{70}{105}$$

5

SIMPLIFY

$$\frac{70}{105} = \frac{70:35}{105:35} = \frac{2}{3}$$

GCF = 35

ANSWER: $\frac{2}{3}$



1.1 Arithmetic

Q24. $(\frac{3}{8} - \frac{1}{5}) \div (\frac{7}{10} - \frac{2}{3})$

1 SOLVE BRACKET 1: $\frac{3}{8} - \frac{1}{5}$

Multiples of 8: 8, 16, 24, 32, 40, 48 ...

Multiples of 5: 5, 10, 15, 20, 25, 30 ...

LCM = 40

2 CONVERT BRACKET 1

$$\frac{3}{8} = \frac{3 \times 5}{8 \times 5} = \frac{15}{40} \quad \frac{1}{5} = \frac{1 \times 8}{5 \times 8} = \frac{8}{40}$$

3 SUBTRACT BRACKET 1

$$\frac{15}{40} - \frac{8}{40} = \frac{7}{40}$$

4 SOLVE BRACKET 2: $\frac{7}{10} - \frac{2}{3}$

Multiples of 10: 10, 20, 30, 40, 50, 60 ...

Multiples of 3: 3, 6, 9, 12, 15, 18 ...

LCM = 30

5 CONVERT BRACKET 2

$$\frac{7}{10} = \frac{7 \times 3}{10 \times 3} = \frac{21}{30} \quad \frac{2}{3} = \frac{2 \times 10}{3 \times 10} = \frac{20}{30}$$

6 SUBTRACT BRACKET 2

$$\frac{21}{30} - \frac{20}{30} = \frac{1}{30}$$

7 DIVIDE BRACKET 1 BY BRACKET 2 - KCF

$$\frac{7}{40} \div \frac{1}{30} \text{ becomes } \frac{7}{40} \times \frac{30}{1}$$

8 MULTIPLY AND SIMPLIFY

$$\frac{210}{40} = \frac{21}{4}$$

GCF = 10

ANSWER: $5 \frac{1}{4}$

Q25. $(\frac{2}{3} + \frac{1}{3}) \div (\frac{3}{4} - \frac{1}{3})$

1

SOLVE BRACKET 1: $\frac{2}{3} + \frac{1}{3}$ (SAME DENOMINATOR)

$$\frac{2}{3} + \frac{1}{3} = \frac{3}{3} = 1$$

2

SOLVE BRACKET 2: $\frac{3}{4} - \frac{1}{3}$

Multiples of 4: 4, 8, 12, 16, 20, 24 ...

Multiples of 3: 3, 6, 9, 12, 15, 18 ...

LCM = 12

3

CONVERT BRACKET 2

$$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12} \quad \frac{1}{3} = \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$$

4

SUBTRACT BRACKET 2

$$\frac{9}{12} - \frac{4}{12} = \frac{5}{12}$$

5

DIVIDE: 1 DIV BRACKET 2 - KCF

$$1 \text{ div } \frac{5}{12} \text{ becomes } 1 \times \frac{12}{5} = \frac{12}{5}$$

6

CONVERT TO MIXED NUMBER

$$\frac{12}{5} = 2 \frac{2}{5}$$

12 / 5 = 2 remainder 2

ANSWER: $2 \frac{2}{5}$



1.1 Arithmetic

Section 4 - Fractions and Decimals

Conversion Rules

- Fraction to Decimal: Divide the numerator by the denominator using long division.
- Decimal to Fraction: Write over 10 (1 d.p.), 100 (2 d.p.), 1000 (3 d.p.) etc., then simplify.
- Recurring Decimal to Fraction: Let x = decimal. Multiply to shift the recurring block. Subtract. Solve.

Example a - Convert $7/8$ to a decimal

1 DIVIDE 7 BY 8 (LONG DIVISION)

$$7.000 / 8$$

Set up with trailing zeros.

2 WORK THROUGH LONG DIVISION

8 into 70 = 8 times (64), rem 6 → 8 into 60 = 7 times (56), rem 4 → 8 into 40 = 5 times exactly

ANSWER: 0.875

Example b - Convert 0.35 to a fraction

1 0.35 HAS 2 DECIMAL PLACES - WRITE OVER 100

$$0.35 = \frac{35}{100}$$

2 SIMPLIFY: $\text{GCF}(35,100) = 5$

$$\frac{35}{100} = \frac{35:5}{100:5} = \frac{7}{20}$$

ANSWER: $\frac{7}{20}$

Example c - Convert $1/3$ to a decimal

1 DIVIDE 1 BY 3

$1.000 / 3 = 0.333...$ (the digit 3 repeats forever)

ANSWER: 0.3 recurring (written with a dot above the 3)

Recurring Decimal - Convert 0.7 (recurring) to a fraction

1	<p>LET X EQUAL THE DECIMAL</p> <p>$x = 0.7777\dots$</p>
2	<p>ONE DIGIT RECURS - MULTIPLY BY 10</p> <p>$10x = 7.7777\dots$</p> <p>Shifts decimal one place right.</p>
3	<p>SUBTRACT ORIGINAL</p> <p>$10x - x = 7.7777\dots - 0.7777\dots \rightarrow 9x = 7$</p> <p>Recurring digits cancel perfectly.</p>
4	<p>SOLVE</p> <p>$x = \frac{7}{9}$</p>

ANSWER: $\frac{7}{9}$

Recurring Decimal - Convert 0.23 (both digits recurring) to a fraction

1	<p>LET X = 0.2323...</p> <p>$x = 0.2323\dots$</p>
2	<p>TWO DIGITS RECUR - MULTIPLY BY 100</p> <p>$100x = 23.2323\dots$</p> <p>Shifts two decimal places.</p>
3	<p>SUBTRACT</p> <p>$100x - x = 23.2323\dots - 0.2323\dots \rightarrow 99x = 23$</p>
4	<p>SOLVE</p> <p>$x = \frac{23}{99}$</p>

ANSWER: $\frac{23}{99}$

Recurring Decimal - Convert 0.534 (last two digits recurring) to a fraction

1	<p>LET X = 0.53434...</p> <p>$x = 0.53434\dots$</p> <p>Only the "34" recurs - the "5" does NOT.</p>
2	<p>MULTIPLY BY 10 TO POSITION RECURRING JUST AFTER DECIMAL</p> <p>$10x = 5.3434\dots$</p>
3	<p>MULTIPLY BY 1000 TO SHIFT ONE FULL CYCLE</p> <p>$1000x = 534.3434\dots$</p>

4

SUBTRACT 10X FROM 1000X

$$1000x - 10x = 534.3434... - 5.3434... \rightarrow 990x = 529$$

The recurring 3434... cancels out.

5

SOLVE

$$x = \frac{529}{990}$$

529 and 990 share no common factors.

ANSWER: $\frac{529}{990}$

TIP: All recurring decimals are RATIONAL numbers. They can always be written as a fraction. Choose the power of 10 based on how many digits recur: 1 digit = multiply by 10, 2 digits = multiply by 100, mixed recurring = use two different powers and subtract.

