

4th Year

Maths

Booklet 2

Fractions



Exercise A

- $\frac{3}{4} \times \frac{1}{5}$
- $\frac{3}{4} \times \frac{3}{5}$
- $\frac{4}{5} \times \frac{2}{3}$
- $\frac{3}{5} \times \frac{2}{3}$
- $\frac{3}{7} \times \frac{2}{9}$
- $\frac{3}{4} \times \frac{2}{9}$
- $\frac{2}{3} \times \frac{9}{14}$
- $\frac{7}{12} \times \frac{18}{35}$
- $\frac{5}{6} \times \frac{2}{15}$
- $\frac{2}{3} \times \frac{6}{7} \times \frac{3}{4}$
- $\frac{3}{7} \times \frac{5}{9} \times \frac{21}{5}$
- $\frac{1}{2} \times \frac{7}{12} \times \frac{18}{21}$
- $2\frac{2}{3} \times 1\frac{1}{4}$
- $4\frac{1}{5} \times \frac{5}{7}$
- $2\frac{1}{5} \times \frac{5}{22}$
- $1\frac{1}{14} \times \frac{21}{25}$
- $\frac{9}{16} \times 2\frac{2}{3}$
- $2\frac{5}{8} \times 2\frac{2}{7}$
- $1\frac{1}{3} \times 1\frac{2}{7} \times 1\frac{1}{4}$
- $7\frac{1}{2} \times \frac{9}{10} \times 1\frac{1}{3}$
- $3\frac{1}{5} \times 2\frac{1}{2} \times 1\frac{3}{4}$
- $4\frac{3}{5} \times 5$
- $1\frac{7}{8} \times 8$
- $3\frac{5}{7} \times 14$
- $28 \times 2\frac{3}{7}$
- $3\frac{1}{3} \times 1\frac{4}{5} \times 2$
- $2\frac{3}{4} \times 1\frac{1}{11} \times \frac{1}{4}$

Exercise B

- $\frac{3}{4} \div \frac{1}{2}$
- $\frac{5}{6} \div \frac{2}{3}$
- $\frac{2}{5} \div \frac{9}{10}$
- $\frac{7}{12} \div \frac{1}{6}$
- $6 \div \frac{3}{4}$
- $12 \div \frac{4}{9}$
- $16 \div \frac{8}{9}$
- $27 \div \frac{3}{4}$
- $2\frac{5}{8} \div \frac{7}{16}$
- $3\frac{3}{4} \div \frac{3}{8}$
- $2\frac{5}{8} \div \frac{3}{4}$
- $2\frac{1}{10} \div \frac{3}{5}$
- $1\frac{1}{8} \div 2\frac{1}{4}$
- $8\frac{1}{4} \div 1\frac{3}{8}$
- $5\frac{5}{8} \div 6\frac{1}{4}$
- $3\frac{1}{8} \div 3\frac{3}{4}$
- $5\frac{3}{7} \div 1\frac{3}{7}$
- $10\frac{5}{6} \div 3\frac{1}{4}$
- $6\frac{2}{3} \div 2\frac{4}{9}$
- $8\frac{2}{3} \div 5\frac{7}{9}$

Exercise C

1. Simplify each of the following expressions:

(i) $\frac{10ab}{2b}$

(ii) $\frac{8xy}{4x}$

(iii) $\frac{15cd}{5d}$

(iv) $\frac{18ab}{6a}$

(v) $\frac{8x^2y}{4xy}$

(vi) $\frac{16b^2c}{2c}$

(vii) $\frac{14x^3y}{2x^2y}$

(viii) $\frac{28ab^2}{7ab}$

2. Simplify these expressions:

(i) $\frac{3}{x} \times \frac{4x}{9}$

(ii) $\frac{km}{4n} \times \frac{2n}{m}$

(iii) $\frac{ab}{3} \times \frac{6b}{a}$

(iv) $\frac{2ab \times 6a}{3a}$

(v) $\frac{x}{3} \div \frac{x}{6}$

(vi) $\frac{3}{2x} \div \frac{1}{3x}$

(vii) $\frac{3ab^2}{2} \div \frac{ab}{6}$

(viii) $\frac{8a \times 3ak}{2a \times 6k}$

Exercise D

I. $\frac{xy}{2} \times \frac{6}{2x^2} \times \frac{(3x)^2}{9x}$

II. $\frac{4x^2y}{5x} \div \frac{xy}{(2x)^2} \times \frac{15x^2y}{(2y)^2}$

III. $\left(\frac{a^2b}{c^2}\right)^2 \times \left(\frac{b^2c}{a^2}\right)^2 \div \left(\frac{c^3a}{b^2}\right)^2$

IV. $\frac{16x^2y}{3xy^4} \times \frac{(3x)^2}{(4xy^2)^3}$

V. $\frac{6x^2y}{5x} \div \frac{xy}{(4x)^3} \times \frac{10x^2y}{(3y)^2}$

VI. $(3x^5)^2 \times (5x^2)^4$

VII. $\frac{(4xy^2)^4}{(5xy)^3} \times \frac{(3x^2y)^2}{(4xy^3)^2}$

Exercise E

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

2. $\frac{3}{7} + \frac{2}{7}$

3. $\frac{1}{9} + \frac{2}{9} + \frac{4}{9}$

4. $\frac{4}{11} + \frac{2}{11} + \frac{1}{11}$

5. $\frac{8}{9} - \frac{2}{9}$

6. $\frac{9}{10} + \frac{7}{10} - \frac{3}{10}$

7. $\frac{5}{7} + \frac{4}{7} - \frac{6}{7}$

8. $\frac{9}{13} - \frac{3}{13} + \frac{5}{13}$

9. $\frac{7}{8} + \frac{5}{8} - \frac{3}{8}$

10. $\frac{1}{4} + \frac{3}{8}$

11. $\frac{3}{10} + \frac{2}{5}$

12. $\frac{5}{6} + \frac{2}{3}$

13. $\frac{3}{7} + \frac{1}{14}$

14. $\frac{5}{12} + \frac{3}{4}$

15. $\frac{2}{5} - \frac{1}{15}$

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

17. $\frac{9}{14} - \frac{1}{7}$

18. $\frac{11}{20} - \frac{1}{5}$

19. $\frac{1}{3} + \frac{2}{5} + \frac{1}{15}$

20. $\frac{3}{8} + \frac{1}{6} + \frac{2}{3}$

21. $\frac{5}{12} + \frac{3}{4} + \frac{1}{3}$

22. $\frac{2}{9} + \frac{1}{3} + \frac{1}{6}$

23. $\frac{3}{4} + \frac{1}{2} - \frac{1}{3}$

24. $\frac{7}{12} + \frac{1}{8} - \frac{1}{6}$

25. $2\frac{1}{3} + 1\frac{1}{6}$

26. $2\frac{1}{4} + 1\frac{1}{3}$

27. $3\frac{1}{2} + 2\frac{3}{5}$

28. $3\frac{3}{10} + 1\frac{4}{5}$

29. $1\frac{3}{4} + 2\frac{5}{12}$

30. $4\frac{1}{5} + 1\frac{1}{3}$

31. $2\frac{7}{10} + 1\frac{3}{5}$

32. $3\frac{1}{5} + 2\frac{2}{3}$

33. $3\frac{2}{3} - 2\frac{1}{2}$

34. $4\frac{3}{4} - 2\frac{1}{2}$

35. $2\frac{7}{8} - 1\frac{3}{4}$

36. $5\frac{2}{3} - 3\frac{1}{4}$

Exercise F

get Common Denominator & simplify :

1. $\frac{x}{7} + \frac{y}{2}$

2. $\frac{2x}{5} + \frac{3y}{4}$

3. $\frac{x}{2} - \frac{y}{3}$

4. $\frac{x}{5} + \frac{x}{2}$

5. $\frac{y}{2} - \frac{y}{3}$

6. $\frac{5a}{3} - \frac{2a}{5}$

7. $\frac{x+1}{2} + \frac{x+3}{5}$

8. $\frac{2a+3}{2} + \frac{a+5}{3}$

9. $\frac{3x-2}{4} - \frac{2x-1}{3}$

10. $\frac{5x+2}{7} - \frac{x+3}{4}$

11. $\frac{2x+7}{4} - \frac{1-x}{3}$

12. $\frac{5-2a}{4} - \frac{1+2a}{5}$

Exercise G :

Get Common Denominator & simplify :

1. $\frac{4}{x} + \frac{3}{y}$

2. $\frac{z}{m} - \frac{3}{n}$

3. $\frac{2}{z} + \frac{3}{a}$

4. $\frac{2}{x+1} + \frac{3}{x+2}$

5. $\frac{2}{y+5} + \frac{3}{y-2}$

6. $\frac{3}{x+5} - \frac{2}{x+3}$

7. $\frac{2}{a-4} - \frac{3}{a+2}$

8. $\frac{x}{x+1} + \frac{3}{x+2}$

9. $\frac{2a}{a+1} + \frac{3}{a-2}$

10. $\frac{4x}{x+3} - \frac{x}{x+2}$

11. $\frac{2a}{a-5} - \frac{3a}{a+2}$

12. $\frac{a}{a+5} - \frac{2a}{a-1}$

Exercise H :

Express each of the following as a single fraction:

1. $\frac{x}{3} + \frac{y}{2}$

2. $\frac{2a}{3} - \frac{b}{6}$

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

4. $\frac{x-3}{4} + \frac{2x+1}{3}$

5. $\frac{2x-3}{9} - \frac{x-1}{3}$

6. $\frac{a+b}{2} + \frac{a-b}{3}$

7. $\frac{5}{x} + \frac{2}{5x}$

8. $\frac{3}{y} - \frac{4}{z}$

9. $\frac{2a}{x} - \frac{3b}{y}$

10. $\frac{3}{x+2} + \frac{2}{x-1}$

11. $\frac{5}{x-2} + \frac{3}{x+3}$

12. $\frac{3x}{x+2} - \frac{2x}{x-1}$

13. $\frac{3}{x(x+2)} + \frac{1}{x(x-1)}$

14. $\frac{3}{x^2-1} - \frac{2}{x-1}$

15. $\frac{3}{x+3} - \frac{2}{x^2-9}$

16. $\frac{5}{x^2-4} + \frac{2}{x+2}$

17. $\frac{2}{x+3} - \frac{x+2}{x^2-9}$

18. $\frac{x+1}{x^2-4} - \frac{5}{x+2}$

19. $\frac{x+2}{2x^2-x-1} - \frac{1}{x-1}$

20. $\frac{8}{x^2-2x-15} - \frac{1}{x-5}$

21. $\frac{6}{x^2-2x-8} + \frac{1}{x+2}$

22. $\frac{10}{2x^2-3x-2} - \frac{2}{x-2}$

23. $\frac{1}{2x^2-x-1} - \frac{1}{2x^2+x-3}$

24. $\frac{1}{x^2-9} - \frac{1}{x^2-x-6}$

25. $\frac{2}{x^2+4x+3} - \frac{1}{x^2+5x+6}$

26. $\frac{3}{x^2-2x-8} - \frac{5}{x^2-5x+4}$

27. $\frac{2}{6x^2-5x-4} - \frac{3}{9x^2-16}$

28. If $a = \frac{x}{5} + 1$ and $b = \frac{x}{2} - 1$, find in terms of x the value of $5a - 4b - 1$.

29. Show that $\frac{2}{1-9x^2} - \frac{1}{2(1+3x)} - \frac{1}{2(1-3x)} = \frac{1}{(1+3x)(1-3x)}$

Exercise I

- | | | | | | |
|------|---------------------------|-------|--|--------|--|
| I. | $\frac{2x+6}{x+3}$ | VII. | $\frac{x^2-2x-15}{x^2+2x-3}$ | XIII. | $\frac{x^2+11x+28}{x^2+x-2} \div \frac{x^2+2x-35}{x^2+5x+6}$ |
| II. | $\frac{3x+3}{2x+2}$ | VIII. | $\frac{x^2+5x+6}{x^2-9}$ | XIV. | $\frac{x^3-x}{x+1}$ |
| III. | $\frac{x+1}{x^2+3x+2}$ | IX. | $\frac{1-x^2}{x-1}$ | XV. | $\frac{x-7}{x^2-2x-35}$ |
| IV. | $\frac{x^2+2x-3}{x-1}$ | X. | $\frac{x^2-5x-6}{x^2-x-6}$ | XVI. | $\frac{x^2+x-6}{x^2-x} \times \frac{x^2-1}{2x-4}$ |
| V. | $\frac{x^2-1}{1-x}$ | XI. | $\frac{6a^2b^2-12a^3b}{3ab^2-6a^2b}$ | XVII. | $\frac{x^2+2x-3}{2x^2-8} \div \frac{x^2+5x-6}{4x+8}$ |
| VI. | $\frac{x^2-16}{x^2+x-12}$ | XII. | $\frac{x+3}{x^2-12x+35} \div \frac{x^2+5x+6}{x-5}$ | XVIII. | $\frac{1}{x+1} + \frac{2}{x-1} + \frac{3}{x^2-1}$ |

Exercise J

Change each of the formulae in questions 1–30 to express the letter in square brackets in terms of the others.

- | | | | | | | | | |
|-----|--------------------------------------|-----|-----|---------------------------------|-----|-----|-----------------------------------|-----|
| 1. | $2a - b = c$ | [a] | 2. | $3p + q = r$ | [p] | 3. | $ab - c = d$ | [a] |
| 4. | $u + at = v$ | [t] | 5. | $3a + 2b = 5c$ | [b] | 6. | $3q - 4p = 2r$ | [q] |
| 7. | $2(a - b) = c$ | [a] | 8. | $a(b - c) = d$ | [b] | 9. | $x(y + z) = w$ | [y] |
| 10. | $\frac{1}{2}a = b$ | [a] | 11. | $\frac{b}{2} + c = a$ | [b] | 12. | $s + \frac{t}{3} = r$ | [t] |
| 13. | $\frac{a}{2} + \frac{b}{3} = c$ | [a] | 14. | $\frac{p+q}{2} = r$ | [q] | 15. | $r = \frac{1}{3}(p - q)$ | [p] |
| 16. | $a = \frac{b-2c}{3}$ | [c] | 17. | $x + \frac{w}{y} = z$ | [w] | 18. | $2p + \frac{3q}{r} = s$ | [q] |
| 19. | $\frac{p-3r}{q} = 5$ | [p] | 20. | $s = \frac{p}{q} + \frac{r}{q}$ | [q] | 21. | $\frac{2a}{b} - \frac{3c}{b} = d$ | [b] |
| 22. | $\frac{1}{2}(3a + b) = \frac{1}{3}c$ | [a] | 23. | $u^2 + 2as = v^2$ | [a] | 24. | $a = \frac{b}{4} - 2c$ | [c] |
| 25. | $\frac{1}{2}at^2 = s$ | [a] | 26. | $v = \frac{1}{3}\pi r^2 h$ | [h] | 27. | $s = ut + \frac{1}{2}at^2$ | [a] |
| 28. | $r = \frac{1}{s} + t$ | [s] | 29. | $p + \frac{t}{q} = r$ | [q] | 30. | $x - \frac{y}{z} = w$ | [z] |

Exercise K

$$1. x - 3 + \frac{2}{x} = 0$$

$$4. x - \frac{2}{x} = 1$$

$$7. x - \frac{4}{x} = 0$$

$$10. 1 = \frac{3}{x} - \frac{4}{x+1}$$

$$13. 4 = \frac{1}{x} - \frac{3}{x-2}$$

$$16. \frac{3}{x-1} - \frac{2}{x+1} = 1$$

$$19. \frac{2}{x} - \frac{3}{x+1} = \frac{1}{2}$$

$$2. x - 7 + \frac{12}{x} = 0$$

$$5. 2x = 5 - \frac{3}{x}$$

$$8. x = \frac{25}{x}$$

$$11. 6 = \frac{1}{x} - \frac{1}{x+3}$$

$$14. \frac{1}{20} = \frac{1}{x} - \frac{1}{x+1}$$

$$17. \frac{5}{2x-1} + 1 = \frac{6}{x}$$

$$20. \frac{2}{x-1} - \frac{1}{x+2} = \frac{1}{2}$$

$$3. x + 2 - \frac{15}{x} = 0$$

$$6. 3x = \frac{3}{x} - 8$$

$$9. x = \frac{1}{x}$$

$$12. 1 = \frac{9}{x+8} + \frac{1}{x}$$

$$15. 3 = \frac{1}{x} - \frac{2}{x-2}$$

$$18. \frac{1}{x} - \frac{1}{x+2} = \frac{1}{4}$$

$$21. \frac{3}{x-2} - \frac{1}{x} = \frac{5}{4}$$

Exercise L

$$1. \frac{\frac{2}{5}}{\frac{3}{4}}$$

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

$$3. \frac{\frac{1}{2} + \frac{1}{3}}{\frac{4}{6}}$$

$$4. \frac{\frac{2}{3} + \frac{1}{5}}{\frac{2}{5} + \frac{1}{3}}$$

$$5. \frac{x + \frac{1}{x}}{x - \frac{1}{x}}$$

$$6. \frac{\frac{2}{x} + \frac{1}{3}}{\frac{1}{2} + \frac{4}{x}}$$

$$7. \frac{1 + \frac{2}{x}}{\frac{x+2}{x-2}}$$

$$8. \frac{\frac{2}{x-y}}{\frac{x^2-y^2}{1} \cdot \frac{1}{1}}$$

$$9. \frac{\frac{1}{x} + \frac{1}{y}}{x+y}$$

$$10. \frac{x + \frac{2x}{x-2}}{1 + \frac{4}{x^2-4}}$$

$$11. \frac{\frac{x}{1+x} + \frac{1-x}{x}}{\frac{x}{1+x} - \frac{1-x}{x}}$$

$$12. \frac{\frac{a}{a+b} + \frac{b}{a-b}}{\frac{a}{a-b} - \frac{b}{a+b}}$$

$$13. \frac{x + \frac{4}{x}}{x - \frac{16}{x^3}}$$