EXPRESSWALA ACADEMY

Fractions and Rational Numbers

Question Paper, Set 02

Time: 1 hour 30 minutes | Maximum marks: 50

Name: _____ Class: _____ Date: _____

1. Answer all 20 questions. The marks for each question are shown in brackets.
2. Show your working for the 2, 3 and 5 mark questions.
3. The key sheet and worked solutions are at the end of this paper.

1. Find $\frac{1}{11} + \frac{1}{11} + \frac{1}{11}$. [1 mark]

2. Three rectangles are each divided into 5 equal parts. All the parts of the first two and 3 parts of the third are shaded. Write the total shaded region as a whole and a proper fraction, and as an improper fraction. [2 marks]

3. From the fractions $\frac{4}{9}, \frac{27}{10}, \frac{8}{13}, \frac{25}{9}, \frac{12}{12}, \frac{2}{15}$, write the improper fractions. [1 mark]

4. Convert $\frac{68}{7}$ into a mixed fraction. [2 marks]

5. Write $2\frac{4}{5}$ as an improper fraction. [1 mark]

6. Are $\frac{17}{12}, \frac{11}{12}, \frac{5}{12}$ like or unlike fractions? Give the reason. [1 mark]

7. Fill in the boxes: $\frac{11}{12} = \frac{\square}{108} = \frac{22}{\square}$ [2 marks]

8. Write the standard form of: (i) $\frac{54}{81}$ (ii) $\frac{-4}{-44}$ (iii) $\frac{36}{-45}$ [3 marks]

9. Write in ascending order: $-19, 13, -51, 17, -57, -24$ [1 mark]

10. Arrange in descending order: $\frac{17}{-10}, \frac{17}{12}, -\frac{1}{2}, -\frac{1}{6}, \frac{1}{2}, \frac{2}{3}$ [5 marks]

11. Using cross multiplication, check whether $\frac{28}{24}$ and $\frac{21}{18}$ are equal. [2 marks]

12. Simplify: $\frac{51}{44} - \frac{60}{44} + \frac{14}{44}$ [2 marks]

13. Find $\frac{1}{3} - \frac{3}{5} + \frac{11}{15}$. [3 marks]

14. Simplify: $-\frac{12}{13} + \frac{1}{7} + \frac{4}{13} - \frac{11}{7}$ [5 marks]

15. Find $5 - \frac{9}{8}$. [1 mark]

16. Find $\frac{2}{21} \times \left(-\frac{15}{32}\right) \times \frac{14}{3}$. [3 marks]

17. Simplify: $\frac{91}{38} \times \left(-\frac{95}{98}\right) \times \left(-\frac{21}{130}\right)$ [5 marks]

18. Find $4\frac{1}{7} \times 5\frac{4}{9}$ and write the answer as a mixed fraction. [5 marks]

19. Find $\frac{13}{10} \div \left(-\frac{17}{10}\right)$. [3 marks]

20. Represent $\frac{7}{9}$ and $-\frac{7}{9}$ on the number line. [2 marks]

Key sheet

Q	Answer
1	$\frac{3}{11}$
2	$2 + \frac{3}{5} = \frac{13}{5}$
3	$\frac{27}{10}, \frac{25}{9}, \frac{12}{12}$
4	$9\frac{5}{7}$
5	$\frac{14}{5}$
6	Like fractions
7	Boxes: 99 and 24
8	(i) $\frac{2}{3}$ (ii) $\frac{1}{11}$ (iii) $-\frac{4}{5}$
9	$-57, -51, -24, -19, 13, 17$
10	$\frac{17}{12}, \frac{2}{3}, \frac{1}{2}, -\frac{1}{6}, -\frac{1}{2}, -\frac{17}{10}$
11	Equal: $\frac{28}{24} = \frac{21}{18}$
12	$\frac{5}{44}$
13	$\frac{7}{15}$
14	$-\frac{186}{91}$
15	$\frac{31}{8}$
16	$-\frac{5}{24}$
17	$\frac{3}{8}$
18	$\frac{203}{9} = 22\frac{5}{9}$
19	$-\frac{13}{17}$
20	Divide 0 to 1 and -1 to 0 into 9 equal parts each; $\frac{7}{9}$ is the 7th point to the right of 0 and $-\frac{7}{9}$ the 7th point to the left.

Solutions

1. Find $\frac{1}{11} + \frac{1}{11} + \frac{1}{11}$. [1]

3 parts of $\frac{1}{11}$ each are added.

$\frac{1}{11} + \frac{1}{11} + \frac{1}{11} = \frac{3}{11}$

Ans: $\frac{3}{11}$

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2. Three rectangles are each divided into 5 equal parts. All the parts of the first two and 3 parts of the third are shaded. Write the total shaded region as a whole and a proper fraction, and as an improper fraction. [2]

First two figures: $\frac{5}{5} + \frac{5}{5} = 1 + 1 = 2$

Third figure: $\frac{3}{5}$

Total shaded region $= 2 + \frac{3}{5}$

$= \frac{10}{5} + \frac{3}{5} = \frac{13}{5}$

Ans: $2 + \frac{3}{5} = \frac{13}{5}$

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3. From the fractions $\frac{4}{9}, \frac{27}{10}, \frac{8}{13}, \frac{25}{9}, \frac{12}{12}, \frac{2}{15}$, write the improper fractions. [1]

Improper fraction: numerator $\geq$ denominator.

$27 > 10$, $25 > 9$, $12 = 12$

Improper fractions: $\frac{27}{10}, \frac{25}{9}, \frac{12}{12}$

Ans: $\frac{27}{10}, \frac{25}{9}, \frac{12}{12}$

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4. Convert $\frac{68}{7}$ into a mixed fraction. [2]

Divide 68 by 7: $7 \times 9 = 63$, $68 - 63 = 5$

Quotient $= 9$, remainder $= 5$

$\therefore \frac{68}{7} = 9 + \frac{5}{7} = 9\frac{5}{7}$

Ans: $9\frac{5}{7}$

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5. Write $2\frac{4}{5}$ as an improper fraction. [1]

$2\frac{4}{5} = \frac{(2\times5)+4}{5}$

$= \frac{10+4}{5} = \frac{14}{5}$

Ans: $\frac{14}{5}$

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6. Are $\frac{17}{12}, \frac{11}{12}, \frac{5}{12}$ like or unlike fractions? Give the reason. [1]

Denominators: $12, 12, 12$

They are the same, so these are like fractions.

Ans: Like fractions

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7. Fill in the boxes: $\frac{11}{12} = \frac{\square}{108} = \frac{22}{\square}$ [2]

$108 = 12 \times 9$, so $\frac{11}{12} = \frac{11\times9}{12\times9} = \frac{99}{108}$

$22 = 11 \times 2$, so $\frac{11}{12} = \frac{11\times2}{12\times2} = \frac{22}{24}$

Ans: Boxes: 99 **and** 24

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8. Write the standard form of: (i) $\frac{54}{81}$ (ii) $\frac{-4}{-44}$ (iii) $\frac{36}{-45}$ [3]

(i) $\frac{54}{81}$

H.C.F of $54, 81 = 27$; $\frac{54 \div 27}{81 \div 27} = \frac{2}{3}$

(ii) $\frac{-4}{-44} = \frac{4}{44}$, since $(-)/(-) = (+)$

H.C.F of $4, 44 = 4$; $\frac{4 \div 4}{44 \div 4} = \frac{1}{11}$

(iii) $\frac{36}{-45} = -\frac{36}{45}$, since $(+)/(-) = (-)$

H.C.F of $36, 45 = 9$; $-\frac{36 \div 9}{45 \div 9} = -\frac{4}{5}$

Ans: (i) $\frac{2}{3}$ (ii) $\frac{1}{11}$ (iii) $-\frac{4}{5}$

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9. Write in ascending order: $-19, 13, -51, 17, -57, -24$ [1]

Every negative number is less than 0 and less than every positive number.

Among negative numbers, the bigger the number after the minus sign, the smaller it is: $-57 < -51 < -24 < -19$

Ascending order: $-57, -51, -24, -19, 13, 17$

Ans: $-57, -51, -24, -19, 13, 17$

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10. Arrange in descending order: $\frac{17}{-10}, \frac{17}{12}, -\frac{1}{2}, -\frac{1}{6}, \frac{1}{2}, \frac{2}{3}$ [5]

$\frac{17}{-10} = -\frac{17}{10}$, since $(+)/(-) = (-)$

L.C.M of $10, 12, 2, 6, 3 = 2 \times 3 \times 5 \times 2 = 60$

$-\frac{17}{10} = \frac{-17 \times 6}{10 \times 6} = -\frac{102}{60}$

$\frac{17}{12} = \frac{17 \times 5}{12 \times 5} = \frac{85}{60}$

$-\frac{1}{2} = \frac{-1 \times 30}{2 \times 30} = -\frac{30}{60}$

$-\frac{1}{6} = \frac{-1 \times 10}{6 \times 10} = -\frac{10}{60}$

$\frac{1}{2} = \frac{1 \times 30}{2 \times 30} = \frac{30}{60}$

$\frac{2}{3} = \frac{2 \times 20}{3 \times 20} = \frac{40}{60}$

Comparing numerators: $\frac{85}{60} > \frac{40}{60} > \frac{30}{60} > -\frac{10}{60} > -\frac{30}{60} > -\frac{102}{60}$

$\Rightarrow \frac{17}{12} > \frac{2}{3} > \frac{1}{2} > -\frac{1}{6} > -\frac{1}{2} > -\frac{17}{10}$

Ans: $\frac{17}{12}, \frac{2}{3}, \frac{1}{2}, -\frac{1}{6}, -\frac{1}{2}, -\frac{17}{10}$

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11. Using cross multiplication, check whether $\frac{28}{24}$ and $\frac{21}{18}$ are equal. [2]

$28 \times 18 = 504$ and $24 \times 21 = 504$

$504 = 504 \Rightarrow \frac{28}{24} = \frac{21}{18}$

Ans: Equal: $\frac{28}{24} = \frac{21}{18}$

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12. Simplify: $\frac{51}{44} - \frac{60}{44} + \frac{14}{44}$ [2]

$= \frac{51 - 60 + 14}{44}$

$= \frac{5}{44}$

Ans: $\frac{5}{44}$

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13. Find $\frac{1}{3} - \frac{3}{5} + \frac{11}{15}$. [3]

L.C.M of $3, 5, 15 = 3 \times 5 = 15$

$= \frac{5-9+11}{15}$

$= \frac{16-9}{15}$

$= \frac{7}{15}$

Ans: $\frac{7}{15}$

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14. Simplify: $-\frac{12}{13} + \frac{1}{7} + \frac{4}{13} - \frac{11}{7}$ [5]

Group the like fractions: $= \left(-\frac{12}{13} + \frac{4}{13}\right) + \left(\frac{1}{7} - \frac{11}{7}\right)$

$= \frac{-12+4}{13} + \frac{1-11}{7}$

$= -\frac{8}{13} - \frac{10}{7}$

L.C.M of $13, 7 = 13 \times 7 = 91$

$= \frac{-56-130}{91} = -\frac{186}{91}$

Ans: $-\frac{186}{91}$

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15. Find $5 - \frac{9}{8}$. [1]

$= \frac{5}{1} - \frac{9}{8}$

$= \frac{40-9}{8}$

$= \frac{31}{8}$

Ans: $\frac{31}{8}$

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16. Find $\frac{2}{21} \times \left(-\frac{15}{32}\right) \times \frac{14}{3}$. [3]

Sign: $(+) \times (-) \times (+) = (-)$

$= -\frac{2 \times 15 \times 14}{21 \times 32 \times 3}$

$= -\frac{2 \times (3 \times 5) \times (2 \times 7)}{(3 \times 7) \times (2 \times 2 \times 2 \times 2 \times 2) \times 3}$

Cancelling the common factors $2, 2, 3, 7$: $= -\frac{5}{2 \times 2 \times 2 \times 3} = -\frac{5}{24}$

Ans: $-\frac{5}{24}$

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17. Simplify: $\frac{91}{38} \times \left(-\frac{95}{98}\right) \times \left(-\frac{21}{130}\right)$ [5]

Sign: $(+) \times (-) \times (-) = (+)$

$= \frac{91 \times 95 \times 21}{38 \times 98 \times 130}$

$= \frac{(7 \times 13) \times (5 \times 19) \times (3 \times 7)}{(2 \times 19) \times (2 \times 7 \times 7) \times (2 \times 5 \times 13)}$

Cancelling the common factors $5, 7, 7, 13, 19$: $= \frac{3}{2 \times 2 \times 2} = \frac{3}{8}$

Ans: $\frac{3}{8}$

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18. Find $4\frac{1}{7} \times 5\frac{4}{9}$ and write the answer as a mixed fraction. [5]

$4\frac{1}{7} = \frac{(4 \times 7)+1}{7} = \frac{29}{7}$

$5\frac{4}{9} = \frac{(5 \times 9)+4}{9} = \frac{49}{9}$

$4\frac{1}{7} \times 5\frac{4}{9} = \frac{29}{7} \times \frac{49}{9} = \frac{29 \times 49}{7 \times 9}$

Cancelling common factors: $= \frac{203}{9}$

$203 \div 9$: quotient 22, remainder 5; $= 22\frac{5}{9}$

Ans: $\frac{203}{9} = 22\frac{5}{9}$

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19. Find $\frac{13}{10} \div \left(-\frac{17}{10}\right)$. [3]

Rule: $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$

$\frac{13}{10} \div \left(-\frac{17}{10}\right) = \frac{13}{10} \times \left(-\frac{10}{17}\right)$ (reciprocal of $-\frac{17}{10}$ is $-\frac{10}{17}$)

$= -\frac{13 \times 10}{10 \times 17}$, since $(+) \times (-) = (-)$

Cancelling common factors: $= -\frac{13}{17}$

Ans: $-\frac{13}{17}$

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20. Represent $\frac{7}{9}$ and $-\frac{7}{9}$ on the number line. [2]

Each part $= \frac{1}{9}$; $1 = \frac{9}{9}$ and $-1 = -\frac{9}{9}$.

Count 7 parts to the right of 0: $\frac{7}{9}$.

Count 7 parts to the left of 0: $-\frac{7}{9}$.

Ans: Divide 0 to 1 and -1 to 0 into 9 equal parts each; $\frac{7}{9}$ is the 7th point to the right of 0 and $-\frac{7}{9}$ the 7th point to the left.