

TEACHING TASK (Page 94 – 95)

JEE MAINS LEVEL QUESTIONS

Multiple Choice Type

1. Which of the following is a proper fraction?

Solution: A proper fraction has a numerator smaller than the denominator.

- **A) $21/5$:** Numerator (21) > Denominator (5) → Improper fraction.
- **B) $13/4$:** Numerator (13) > Denominator (4) → Improper fraction.
- **C) $3/4$:** Numerator (3) < Denominator (4) → Proper fraction.
- **D) $4/3$:** Numerator (4) > Denominator (3) → Improper fraction.

Answer: C

2. Compare $4/5$ and $5/9$

Solution: To compare fractions with different denominators, find the LCM of the denominators (5 and 9), which is 45. Convert both fractions to equivalent fractions with denominator 45.

- **$4/5 = (4 \times 9)/(5 \times 9) = 36/45$**
- **$5/9 = (5 \times 5)/(9 \times 5) = 25/45$**

Since $36/45 > 25/45$, we have $4/5 > 5/9$.

Answer: A

3. Which of the following is an improper fraction?

Solution: An improper fraction has a numerator greater than or equal to the denominator.

- **A) $3/15$:** Numerator (3) < Denominator (15) → Proper fraction.
- **B) $7/3$:** Numerator (7) > Denominator (3) → Improper fraction.
- **C) $3/7$:** Numerator (3) < Denominator (7) → Proper fraction.

- **D) $1/2$:** Numerator (1) < Denominator (2) → Proper fraction.

Answer: B

4. If $45/60$ is equivalent to $3/x$, then $x =$

Solution: Since the fractions are equivalent, their ratios are equal: $45/60 = 3/x$ Simplify $45/60$ by dividing numerator and denominator by their GCD (15): $45 \div 15 / 60 \div 15 = 3/4$ Thus, $3/4 = 3/x$ Equating denominators, $x = 4$.

Answer: D

5. Which of the following is in descending order?

Solution: Descending order means arranging from largest to smallest. Compare the fractions $11/17$, $9/13$, and $5/8$ by converting them to a common denominator. The LCM of 17, 13, and 8 is 1768.

- **$11/17 = (11 \times 104)/(17 \times 104) = 1144/1768$**
- **$9/13 = (9 \times 136)/(13 \times 136) = 1224/1768$**
- **$5/8 = (5 \times 221)/(8 \times 221) = 1105/1768$**

Comparing: $1224/1768$ ($9/13$) > $1144/1768$ ($11/17$) > $1105/1768$ ($5/8$). Thus, descending order is $9/13$, $11/17$, $5/8$.

Check options:

- **A) $11/17$, $9/13$, $5/8$:** Incorrect ($11/17 < 9/13$).
- **B) $9/13$, $11/17$, $5/8$:** Correct (matches descending order).
- **C) $5/8$, $11/17$, $9/13$:** Incorrect (ascending order).
- **D) $5/8$, $9/13$, $11/17$:** Incorrect (ascending order).

Answer: B

JEE ADVANCED LEVEL QUESTIONS

Multiple Correct Type

1. Which of the following pairs of fractions are equivalent?

Solution: Equivalent fractions have the same value when simplified.

- **A) $1/2$, $2/4$:** $2/4 \div 2/2 = 1/2 \rightarrow$ Equivalent.
- **B) $1/3$, $3/9$:** $3/9 \div 3/3 = 1/3 \rightarrow$ Equivalent.
- **C) $2/5$, $4/9$:** $2/5 = 0.4$, $4/9 \approx 0.444 \rightarrow$ Not equivalent.
- **D) $4/7$, $8/13$:** $4/7 \approx 0.571$, $8/13 \approx 0.615 \rightarrow$ Not equivalent.

Answer: A, B

Statement Type

2. Statement I: $3/4$ and $2/4$ are like fractions.

Statement II: Denominators are same in like fractions.

Solution:

- **Statement I:** Like fractions have the same denominator. Here, $3/4$ and $2/4$ both have denominator 4 \rightarrow True.
- **Statement II:** By definition, like fractions have the same denominators \rightarrow True.

Answer: A

Comprehension Type

3. Which of the following fraction is less than $7/8$ and greater than $1/3$?

Solution: Convert $7/8$ and $1/3$ to decimals for easier comparison:

- $7/8 = 0.875$
- $1/3 \approx 0.333$

Now check each option:

- **A) $1/4 = 0.25$:** $0.25 < 0.333 \rightarrow$ Not greater than $1/3$.
- **B) $23/24 \approx 0.958$:** $0.958 > 0.875 \rightarrow$ Not less than $7/8$.
- **C) $11/12 \approx 0.916$:** $0.916 > 0.875 \rightarrow$ Not less than $7/8$.

- **D) $17/24 \approx 0.708$:** $0.333 < 0.708 < 0.875 \rightarrow$ Satisfies the condition.

Alternatively, use LCM (24) to compare:

- $7/8 = 21/24$
- $1/3 = 8/24$
- $17/24$ is between $8/24$ and $21/24$.

Answer: D

4. Which of the following shows the correct ascending order of the fractions $2/3$, $3/5$, $4/15$ after converting them to like fractions?

Solution: Find LCM of denominators $(3, 5, 15) = 15$. Convert fractions:

- $2/3 = (2 \times 5)/(3 \times 5) = 10/15$
- $3/5 = (3 \times 3)/(5 \times 3) = 9/15$
- $4/15 = 4/15$

Compare: $4/15 < 9/15 < 10/15$, so ascending order is $4/15, 3/5, 2/3$.

Check options:

- **A) $3/5 < 2/3 < 4/15$:** Incorrect ($4/15$ is smallest).
- **B) $4/15 < 3/5 < 2/3$:** Correct.
- **C) $2/3 < 3/5 < 4/15$:** Incorrect.
- **D) $4/15 < 2/3 < 3/5$:** Incorrect.

Answer: B

Integer Type

5. If $11/4 = 77/x$, then $x =$

Solution: Since the fractions are equal: $11/4 = 77/x$ Cross-multiply: $11x = 77 \times 4 = 308$ $x = 308/11 = 28$.

Answer: 28

Matrix Matching Type

6. Match Column-I with Column-II

Solution: Convert each item in Column-I to a fraction and match with Column-II.

- **a) 80p as a fraction of Rs.5:** Rs.5 = 500p. Fraction = $80/500 = 8/50 = 4/25 \rightarrow$ Matches **r**.
- **b) 8 hours as a fraction of 2 days:** 2 days = $2 \times 24 = 48$ hours. Fraction = $8/48 = 1/6 \rightarrow$ Matches **s**.
- **c) 450g as fraction of 1kg:** 1kg = 1000g. Fraction = $450/1000 = 45/100 = 9/20 \rightarrow$ Matches **q**.
- **d) 350ml as a fraction of 1 litre:** 1 litre = 1000ml. Fraction = $350/1000 = 35/100 = 7/20 \rightarrow$ Matches **p**.

Answer: a-r, b-s, c-q, d-p

LEARNERS TASK (Page 95 – 97)

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQs)

Multiple Choice Type

1. If $4/a = 9/18$, then value of a is

Solution: Simplify $9/18 = 1/2$. Thus, $4/a = 1/2$ Cross-multiply: $1 \times a = 4 \times 2 \rightarrow a = 8$.

Answer: B

2. While converting unlike fractions to like fractions we find

Solution: To compare or operate on unlike fractions, we convert them to like fractions by finding the LCM of their denominators.

Answer: D

3. Convert $10/3$ to a mixed fraction

Solution: Divide 10 by 3: $10 \div 3 = 3$ (quotient) with remainder 1. Mixed fraction = $3 \frac{1}{3}$.

Check options:

- **A) $3 \frac{1}{3}$:** Correct.
- **B) $3 \frac{1}{2}$:** Incorrect.
- **C) $2 \frac{1}{5}$:** Incorrect.
- **D) $3 \frac{1}{5}$:** Incorrect.

Answer: A

4. Convert $3 \frac{2}{5}$ to an improper fraction

Solution: Mixed fraction $3 \frac{2}{5} = (3 \times 5 + 2)/5 = (15 + 2)/5 = 17/5$.

Answer: C

5. What fraction of an hour is 30 minutes?

Solution: 1 hour = 60 minutes. Fraction = $30/60 = 1/2$.

Answer: B

JEE MAINS LEVEL QUESTIONS

Multiple Choice Type

1. Which one of the following fraction is the smallest?

Solution: Compare $1/2$, $4/9$, $14/27$, $2/3$ using LCM of denominators $(2, 9, 27, 3) = 54$.

- $1/2 = 27/54$
- $4/9 = 24/54$
- $14/27 = 28/54$
- $2/3 = 36/54$

Order: $24/54$ ($4/9$) $<$ $27/54$ ($1/2$) $<$ $28/54$ ($14/27$) $<$ $36/54$ ($2/3$). Smallest is $4/9$.

Answer: B

2. Which one of the following fractions is the greatest?

Solution: Compare $1/3$, $5/12$, $2/5$, $13/30$ using LCM of denominators ($3, 12, 5, 30$) = 60 .

- $1/3 = 20/60$
- $5/12 = 25/60$
- $2/5 = 24/60$
- $13/30 = 26/60$

Order: $20/60 < 24/60 < 25/60 < 26/60$. Greatest is $13/30$.

Answer: D

3. Reduce the fraction 315/405 into lowest form

Solution: Find GCD of 315 and 405: $315 = 3^2 \times 5 \times 7$, $405 = 3^4 \times 5 \rightarrow \text{GCD} = 3^2 \times 5 = 45$. Divide: $315 \div 45 / 405 \div 45 = 7/9$.

Answer: C

4. If the fractions 7/13, 2/3, 4/11, 5/9 are arranged in ascending order, the correct order is

Solution: LCM of denominators ($13, 3, 11, 9$) = 1287 . Convert:

- $7/13 = (7 \times 99)/(13 \times 99) = 693/1287$
- $2/3 = (2 \times 429)/(3 \times 429) = 858/1287$
- $4/11 = (4 \times 117)/(11 \times 117) = 468/1287$
- $5/9 = (5 \times 143)/(9 \times 143) = 715/1287$

Order: $468/1287$ ($4/11$) $<$ $693/1287$ ($7/13$) $<$ $715/1287$ ($5/9$) $<$ $858/1287$ ($2/3$). Ascending order: $4/11, 7/13, 5/9, 2/3$.

Answer: C

5. Which of the following fractions is not equivalent to $\frac{1}{3}$?

Solution: Equivalent fractions equal $\frac{1}{3}$ when simplified:

- **A) $\frac{5}{15} = \frac{1}{3}$:** Equivalent.
- **B) $\frac{6}{18} = \frac{1}{3}$:** Equivalent.
- **C) $\frac{4}{12} = \frac{1}{3}$:** Equivalent.
- **D) $\frac{7}{20} = 0.35$:** Not equal to $\frac{1}{3}$ (≈ 0.333).

Answer: D

JEE ADVANCED LEVEL QUESTIONS

Multiple Correct Type

1. Which of the following pairs of fractions are like fractions? Like fractions have the same denominator.

- **A) $\frac{1}{5}, \frac{4}{5}$:** Same denominator (5) \rightarrow Like fractions.
- **B) $\frac{2}{3}, \frac{3}{4}$:** Different denominators \rightarrow Not like fractions.
- **C) $\frac{1}{6}, \frac{5}{6}$:** Same denominator (6) \rightarrow Like fractions.
- **D) $\frac{5}{6}, \frac{6}{7}$:** Different denominators \rightarrow Not like fractions.

Answer: A, C

Statement Type

2. Statement I: Ascending order of $\frac{2}{3}, \frac{2}{7}, \frac{2}{11}, \frac{2}{5}, \frac{2}{9}$ is $\frac{2}{3}, \frac{2}{5}, \frac{2}{7}, \frac{2}{9}, \frac{2}{11}$.

Statement II: Ascending order of given numbers is to write the given numbers from smallest to greatest.

Solution:

- **Statement II:** True by definition of ascending order.

- **Statement I:** Since numerators are the same (2), compare by denominators. Larger denominator means smaller fraction. Order of denominators (3, 5, 7, 9, 11): Ascending fraction order is $2/11, 2/9, 2/7, 2/5, 2/3$ (smallest to largest). The given order ($2/3, 2/5, 2/7, 2/9, 2/11$) is descending, not ascending \rightarrow False.

Answer: D

Comprehension Type

Rani typed 50 pages of a book containing 100 pages. Meena typed $1/4$ th pages of same book.

3. Who typed more?

Solution:

- Rani: $50/100 = 1/2$ of the book.
- Meena: $1/4$ of $100 = 25/100 = 1/4$. Compare: $1/2 > 1/4$, so Rani typed more.

Answer: A

4. The number of pages typed by Meena is

Solution: Meena typed $1/4 \times 100 = 25$ pages.

Answer: A

Integer Type

4. If $(5/10) - x = 2/30$, then the value of x = Simplify $5/10 = 1/2$.

Equation: $1/2 - x = 2/30 = 1/15$ $x = 1/2 - 1/15 = (15 - 2)/30 = 13/30$.

Answer: 13/30

Matrix Matching Type

5. Match Column I with Column II

Solution:

- **a) Simplest form of 24/78:** $\text{GCD}(24, 78) = 6$. $24 \div 6 / 78 \div 6 = 4/13$
→ Matches **q**.
- **b) Fraction equivalent to 3/5:** $3/5 = 12/20$ (multiply by 4/4) →
Matches **r**.
- **c) 3/5 ___ 8/5:** Same denominator, $3 < 8$, so $3/5 < 8/5$ → Matches **p**.
- **d) 5/3 ___ 7/10:** LCM of 3 and 10 = 30.
 - $5/3 = 50/30$
 - $7/10 = 21/30$ $50/30 > 21/30$, so $5/3 > 7/10$ → Matches **s**.

Answer: a-q, b-r, c-p, d-s