Unit 3 Simplification

Exercise 3.1

1. Simplify the following.

(i) $10-3(7+8-3)\times 2\div 2$

Solution: To solve this expression use BODMAS rule.

$=10-3(7+8-3)\times 2\div 2$ Solve round brackets.

$=10-3(15-3)\times 2\div 2$ Apply addition.

$=10-3(12)\times 2\div 2$ Apply subtraction.

$=10-36\times 2\div 2$ Apply multiplication.

$=10-36\times 1$ Apply division.

$=10-36$ Apply multiplication.

$=-26$ Apply subtracation.

(ii) $90+3(7-10+2)\times 2 \text{ of } 2$

Solution: To solve this expression use BODMAS rule.

$=90+3(7-10+2)\times 2 \text{ of } 2$ Solve round brackets.

$=90+3(9-10)\times 2 \text{ of } 2$ Apply addition.

$=90+3(-1)\times 2 \text{ of } 2$ Apply subtraction.

$=90-3\times 2\times 2$ Of means multiplication.

$=90-12$ Apply multiplication.

$=78$ Apply subtracation.

(iii) $270\div\left[50+\left\{55-\left(124\div 2-\overline{6+5}\right)\right\}\right]$

Solution: To solve this expression use BODMAS rule

$=270\div\left[50+\left\{55-\left(124\div 2-\overline{6+5}\right)\right\}\right]$ Solve vinculum.

$=270\div\left[50+\left\{55-(124\div 2-11)\right\}\right]$ Apply division in curved brackets.

$=270\div\left[50+\left\{55-(62-11)\right\}\right]$ Apply subtraction in curved brackets.

$=270\div\left[50+\{55-(51)\}\right]$ Apply subtraction in curly brackets.

$=270\div[50+\{4\}]$ Apply addition in square brackets.

$=270\div[54]$ Apply division.

$=5$

(iv) $12\times\left[15+\left\{20-(110-2\times 92\div 2)\right\}\right]$

Solution: To solve this expression use BODMAS rule

$=12\times\left[15+\left\{20-(110-2\times 92\div 2)\right\}\right]$ Solve curved brackets.

$=12\times\left[15+\left\{20-(110-2\times 46)\right\}\right]$ Apply division in curved brackets.

$=12\times\left[15+\left\{20-(110-92)\right\}\right]$ Apply multiplication in curved brackets.

$=12\times\left[15+\left\{20-(18)\right\}\right]$ Apply subtraction in curved brackets.

$=12\times\left[15+\{2\}\right]$ Apply subtraction in curly brackets.

$=12\times[17]$ Apply addition.

$=204$ Apply multiplication.

(v) $315+\left[40\times\left\{\left(70-\overline{50+14}\right)-\left(25-\overline{8-12}\right)\right\}\right]$

$= 315 + \left[40 \times \left\{ \left(70 - \overline{50 + 14} \right) - \left(25 - \overline{8 - 12} \right) \right\} \right]$ Solve vinculum.

$= 315 + \left[40 \times \left\{ (70 - 64) - (25 - (-4)) \right\} \right]$ Solve curved brackets.

$= 315 + \left[40 \times \left\{ (6) - (25 + 4) \right\} \right]$ Solve curly brackets.

$= 315 + \left[40 \times \{ 6 - 29 \} \right]$ Apply subtraction in curly brackets.

$= 315 + \left[40 \times \{ -23 \} \right]$ Apply multiplication.

$= 315 + [-920]$ Apply addition.

$= 315 - 920$ Apply subtraction.

$= -605$

2. Simplify the following mathematical expressions involving fraction using BODMAS rule.

(i) $1\frac{1}{3} \times 4 \left[1\frac{2}{3} - 4 \left\{ \frac{5}{2} \times \left(\frac{2}{2} - \overline{\frac{1}{2} + \frac{2}{4}} \right) \right\} \right]$

Solution: To solve this expression use BODMAS rule

$= 1\frac{1}{3} \times 4 \left[1\frac{2}{3} - 4 \left\{ \frac{5}{2} \times \left(\frac{2}{2} - \overline{\frac{1}{2} + \frac{2}{4}} \right) \right\} \right]$ Solve vinculum.

$= 1\frac{1}{3} \times 4 \left[1\frac{2}{3} - 4 \left\{ \frac{5}{2} \times \left(\frac{2}{2} - \frac{2+2}{4} \right) \right\} \right]$ Take LCM to add fractions.

$= 1\frac{1}{3} \times 4 \left[1\frac{2}{3} - 4 \left\{ \frac{5}{2} \times \left(\frac{2}{2} - 1 \right) \right\} \right]$ Apply division in curved brackets.

$= 1\frac{1}{3} \times 4 \left[1\frac{2}{3} - 4 \left\{ \frac{5}{2} \times (1 - 1) \right\} \right]$ Apply subtraction in curved brackets.

$= 1\frac{1}{3} \times 4 \left[1\frac{2}{3} - 4 \left\{ \frac{5}{2} \times (0) \right\} \right]$ Solve curly brackets.

$= 1\frac{1}{3} \times 4 \left[1\frac{2}{3} - 4 \{ 0 \} \right]$ Pr oduct of zero with any number results zero.

$= 1\frac{1}{3} \times 4 \left[1\frac{2}{3} - 0 \right]$ Apply subtraction in square brackets.

$= 1\frac{1}{3} \times 4 \left[1\frac{2}{3} \right]$ Find difference.

$= \frac{4}{3} \times 4 \left[\frac{5}{3} \right]$ Change mixed number int o improper fraction.

$= \frac{4 \times 4 \times 5}{3 \times 3}$ Apply multiplication on fractions.

$= \frac{80}{9}$ or $8\frac{8}{9}$

(ii) $\frac{23}{5} \times \left[\frac{1}{5} \div \left\{ 1\frac{1}{4} + 5\frac{1}{2} - \frac{7}{2} \right\} \right]$

Solution: To solve this expression use BODMAS rule

$= \frac{23}{5} \times \left[\frac{1}{5} \div \left\{ 1\frac{1}{4} + 5\frac{1}{2} - \frac{7}{2} \right\} \right]$ Change mixed number int o improper fraction.

$= \frac{23}{5} \times \left[\frac{1}{5} \div \left\{ \frac{5}{4} + \frac{11}{2} - \frac{7}{2} \right\} \right]$ Apply addition in curly brackets.

$= \frac{23}{5} \times \left[\frac{1}{5} \div \left\{ \frac{5+22}{4} - \frac{7}{2} \right\} \right]$ Take LCM to add fractions.

$= \frac{23}{5} \times \left[\frac{1}{5} \div \left\{ \frac{27}{4} - \frac{7}{2} \right\} \right]$ Apply subtraction in curly brackets.

$= \frac{23}{5} \times \left[\frac{1}{5} \div \left\{ \frac{27-14}{4} \right\} \right]$ Take LCM to subtract fractions.

$= \frac{23}{5} \times \left[\frac{1}{5} \div \left\{ \frac{13}{4} \right\} \right]$ Solve square brackets.

$= \frac{23}{5} \times \left[\frac{1}{5} \times \frac{4}{13} \right]$ Change division symbol and take reciprocal of fraction.

$= \frac{23}{5} \times \left[\frac{4}{65} \right] = \frac{92}{325}$ Multiply fractions.

(iii) $2\frac{3}{7} - \left[3\frac{1}{2} \times \left\{ \frac{18}{2} \div \left(3\frac{2}{3} - 2\overline{\frac{5}{6} - 1\frac{1}{2}} \right) \right\} \right]$

Solution: To solve this expression use BODMAS rule

$= 2\frac{3}{7} - \left[3\frac{1}{2} \times \left\{ \frac{18}{2} \div \left(3\frac{2}{3} - 2\overline{\frac{5}{6} - 1\frac{1}{2}} \right) \right\} \right]$ Change mixed numbers int o improper fractions.

$= \frac{17}{7} - \left[\frac{7}{2} \times \left\{ \frac{18}{2} \div \left(\frac{11}{3} - \overline{\frac{17}{6} - \frac{3}{2}} \right) \right\} \right]$ Solve vinculum by applying subtraction in curved brackets.

$= \frac{17}{7} - \left[\frac{7}{2} \times \left\{ \frac{18}{2} \div \left(\frac{11}{3} - \frac{17-9}{6} \right) \right\} \right]$ Take LCM to subtract.

$= \frac{17}{7} - \left[\frac{7}{2} \times \left\{ \frac{18}{2} \div \left(\frac{11}{3} - \frac{8}{6} \right) \right\} \right]$ Apply subtraction in curved brackets.

$= \frac{17}{7} - \left[\frac{7}{2} \times \left\{ \frac{18}{2} \div \left(\frac{22-8}{6} \right) \right\} \right]$ Take LCM to subtract.

$= \frac{17}{7} - \left[\frac{7}{2} \times \left\{ \frac{18}{2} \div \frac{14}{6} \right\} \right]$ Solve curly brackets.

$= \frac{17}{7} - \left[\frac{7}{2} \times \left\{ \frac{18}{2} \times \frac{6}{14} \right\} \right]$ Take reciprocal of fraction and change the symbol.

$= \frac{17}{7} - \left[\frac{7}{2} \times \left\{ \frac{\cancel{18}^{9}}{\cancel{2}} \times \frac{\cancel{6}^{3}}{\cancel{14}_{7}} \right\} \right]$ Simplify fractions in curly brackets.

$= \frac{17}{7} - \left[\frac{7}{2} \times \left\{ \frac{9 \times 3}{7} \right\} \right]$ Multiply fractions in curly brackets.

$= \frac{17}{7} - \left[\frac{7}{2} \times \left\{ \frac{27}{7} \right\} \right]$ Apply multiplication on fractions.

$= \frac{17}{7} - \left[\frac{7 \times 27}{2 \times 7} \right]$ Solve square brackets.

$= \frac{17}{7} - \left[\frac{189}{14} \right]$ Apply subtracation on fractions.

$= \frac{34-189}{14} = -\frac{155}{14}$

(iv) $2 \div \left[8 \text{ of } 2 \times \left\{ 1\frac{2}{3} \div \left(1\frac{1}{4} - 4\overline{\frac{1}{2} - \frac{7}{2}} \right) \right\} \right]$

Solution: To solve this expression use BODMAS rule

$= 2 \div \left[8 \text{ of } 2 \times \left\{ 1\frac{2}{3} \div \left(1\frac{1}{4} - 4\overline{\frac{1}{2} - \frac{7}{2}} \right) \right\} \right]$ Change mixed numbers int o improper fractions.

$= 2 \div \left[8 \text{ of } 2 \times \left\{ \frac{5}{3} \div \left(\frac{5}{4} - \overline{\frac{9}{2} - \frac{7}{2}} \right) \right\} \right]$ Solve vinculum by applying subtraction in curved brackets.

$= 2 \div \left[8 \text{ of } 2 \times \left\{ \frac{5}{3} \div \left(\frac{5}{4} - \frac{9-7}{2} \right) \right\} \right]$ Take LCM to subtract.

$= 2 \div \left[8 \text{ of } 2 \times \left\{ \frac{5}{3} \div \left(\frac{5}{4} - \frac{2}{2} \right) \right\} \right]$ Apply subtraction in curved brackets.

$= 2 \div \left[8 \text{ of } 2 \times \left\{ \frac{5}{3} \div \left(\frac{5-4}{4} \right) \right\} \right]$ Take LCM to subtract.

$= 2 \div \left[8 \text{ of } 2 \times \left\{ \frac{5}{3} \div \left(\frac{1}{4} \right) \right\} \right]$ Solve curly brackets.

$= 2 \div \left[8 \text{ of } 2 \times \left\{ \frac{5}{3} \times \frac{4}{1} \right\} \right]$ Take reciprocal of fraction and change the symbol.

$= 2 \div \left[8 \text{ of } 2 \times \left\{ \frac{20}{3} \right\} \right]$ Simplify fractions in curly brackets.

$= 2 \div \left[8 \times 2 \times \frac{20}{3} \right]$ Apply multiplication on fractions.

$= 2 \div \left[\frac{8 \times 2 \times 20}{3} \right]$ Apply multiplication on fractions.

$= 2 \div \left[\frac{320}{3} \right]$ Take reciprocal of fraction and change the symbol.

$= 2 \times \frac{3}{320}$ Apply multiplication on fractions.

$= \cancel{2} \times \frac{3}{\cancel{320}_{160}}$ Simplify fractions.

$= \frac{3}{160}$

(v) $3\frac{1}{7} \div \left\{ \frac{5}{6} - \left(\frac{7}{8} + 1\overline{\frac{2}{5} - 1\frac{7}{9}} \right) \right\} \times \frac{2}{3}$

Solution: To solve this expression use BODMAS rule

$= 3\frac{1}{7} \div \left\{\frac{5}{6} - \left(\frac{7}{8} + 1\frac{2}{5} - 1\frac{7}{9}\right)\right\} \times \frac{2}{3}$ Change mixed numbers int o improper fractions.

$= \frac{22}{7} \div \left\{\frac{5}{6} - \left(\frac{7}{8} + \frac{7}{5} - \frac{16}{9}\right)\right\} \times \frac{2}{3}$ Solve vinculum by applying subtraction in curved brackets.

$= \frac{22}{7} \div \left\{\frac{5}{6} - \left(\frac{7}{8} + \frac{63-80}{45}\right)\right\} \times \frac{2}{3}$ Take LCM to subtract.

$= \frac{22}{7} \div \left\{\frac{5}{6} - \left(\frac{7}{8} - \frac{17}{45}\right)\right\} \times \frac{2}{3}$ Apply subtraction in curved brackets.

$= \frac{22}{7} \div \left\{\frac{5}{6} - \left(\frac{315-136}{360}\right)\right\} \times \frac{2}{3}$ Take LCM to subtract.

$= \frac{22}{7} \div \left\{\frac{5}{6} - \left(\frac{179}{360}\right)\right\} \times \frac{2}{3}$ Solve curly brackets.

$= \frac{22}{7} \div \left\{\frac{300-179}{360}\right\} \times \frac{2}{3}$ Take LCM to subtract.

$= \frac{22}{7} \div \left\{\frac{121}{360}\right\} \times \frac{2}{3}$ Solve division before multiplication.

$= \frac{22}{7} \times \frac{360}{121} \times \frac{2}{3}$ Take reciprocal of fraction and change the symbol.

$= \frac{\cancel{22}^{2}}{7} \times \frac{\cancel{360}^{120}}{\cancel{121}_{11}} \times \frac{2}{\cancel{3}}$ Simplify fractions.

$= \frac{2 \times 120 \times 2}{7 \times 11}$ Apply multiplication on fractions

$= \frac{480}{77}$ or $6\frac{18}{77}$

3. Simplify the following mathematical expressions involving decimals using BODMAS rule.

(i) $10.8 \div 2.2 - (-3.8)$

Solution: To solve this expression use BODMAS rule

$= 10.8 \div 2.2 - (-3.8)$ Apply subtraction on curved brackets.

$= 10.8 \div 2.2 + 3.8$ Apply division.

$= 4.91 + 3.8$ Apply addition.

$= 8.71$

(ii) $16.31 + \left\{2.50 - \left(5.94 \div 2.20 - \overline{1.875 + 2.23}\right)\right\}$

Solution: To solve this expression use BODMAS rule

$= 16.31 + \left\{2.50 - \left(5.94 \div 2.20 - \overline{1.875 + 2.23}\right)\right\}$ Solve vinculum.

$= 16.31 + \left\{2.50 - \left(5.94 \div 2.20 - 4.105\right)\right\}$ Apply division in curved brackets.

$= 16.31 + \left\{2.50 - \left(2.70 - 4.105\right)\right\}$ Apply subtraction in curved brackets.

$= 16.31 + \left\{2.50 - \left(-1.405\right)\right\}$ Apply subtraction on curved brackets.

$= 16.31 + \left\{2.50 + 1.405\right\}$ Solve curly brackets.

$= 16.31 + 3.905$ Apply addition.

$= 20.215$

(iii) $16.21 \div \left[3.251 + \left\{2.041 - \left(1.9 \times 1.06 + \overline{1.02 - 1.11}\right)\right\}\right]$

Solution: To solve this expression use BODMAS rule

$= 16.21 \div \left[3.251 + \left\{2.041 - \left(1.9 \times 1.06 + \overline{1.02 - 1.11}\right)\right\}\right]$ Solve vinculum.

$= 16.21 \div \left[3.251 + \left\{2.041 - \left(1.9 \times 1.06 - 0.09\right)\right\}\right]$ Apply multiplication in curved brackets.

$= 16.21 \div \left[3.251 + \left\{2.041 - \left(2.014 - 0.09\right)\right\}\right]$ Apply subtraction in curved brackets.

$= 16.21 \div \left[3.251 + \left\{2.041 - \left(1.924\right)\right\}\right]$ Apply subtraction in curly brackets.

$= 16.21 \div \left[3.251 + \left\{0.117\right\}\right]$ Solve square brackets.

$= 16.21 \div 3.368$ Apply division.

$= 4.813$

(iv) $6.27 + \left\{3.3 \times \left(4.4 \div 2.2 - \overline{1.1 + 6.6}\right)\right\}$

Solution: To solve this expression use BODMAS rule

$= 6.27 + \left\{3.3 \times \left(4.4 \div 2.2 - \overline{1.1 + 6.6}\right)\right\}$ Solve vinculum.

$= 6.27 + \left\{3.3 \times \left(4.4 \div 2.2 - 7.7\right)\right\}$ Apply division in curved brackets.

$= 6.27 + \left\{3.3 \times \left(2 - 7.7\right)\right\}$ Apply subtraction in curved brackets.

$= 6.27 + \left\{3.3 \times \left(-5.5\right)\right\}$ Apply multiplication in curly brackets.

$= 6.27 + \left\{-18.15\right\}$ Apply addition.

$= 6.27 - 18.15$ Apply subtraction.

$= -11.88$

(v) $6.53 - \left[7.10 \times 2 - \left\{42 - \left(3.5 + \overline{8 - 3}\right)\right\}\right]$

Solution: To solve this expression use BODMAS rule

$= 6.53 - \left[7.10 \times 2 - \left\{42 + \left(3.5 + \overline{8 - 3}\right)\right\}\right]$ Solve vinculum.

$= 6.53 - \left[7.10 \times 2 - \left\{42 + \left(3.5 + 5\right)\right\}\right]$ Apply addition in curved brackets.

$= 6.53 - \left[7.10 \times 2 - \left\{42 + \left(8.5\right)\right\}\right]$ Apply addition in curly brackets.

$= 6.53 - \left[7.10 \times 2 - \left\{50.5\right\}\right]$ Apply multiplication in square brackets.

$= 6.53 - \left[14.20 - 50.5\right]$ Apply subtraction.

$= 6.53 - \left[-36.3\right]$ Apply subtraction.

$= 6.53 + 36.3$ Apply addition.

$= 42.83$

Review Exercise 3

1. Encircle the correct option.

(i) The procedure to simplify the mathematical expression is called:

(a) mathematical operation (b) BODMAS

(c) simplification (d) integers

(ii) Vinculum is:

(a) [ ] (b) { } (c) ___ (d) ( )

(iii) In BODMAS rule, 'M' stands for:

(a) means (b) multiplication (c) division (d) subtraction

(iv) **If a mathematical expression contains only multiplication and division, then we solve the expression from:**

(a) left to right (b) right to left
(c) BODMAS (d) firstly perform division then multiplication

(v) **In mathematics, to group numbers in mathematical expression, we use:**

(a) brackets (b) addition and subtraction
(c) BODMAS rule (d) vinculum

(vi) **When there is no sign of mathematical operation between a number or brackets, we perform:**

(a) multiplication (b) addition (c) subtraction (d) division

(vii) **Curved brackets are also known as:**

(a) square brackets (b) curly brackets (c) braces (d) parentheses

(viii) **If a word 'of' is used in mathematical expression, it means:**

(a) Addition (b) subtraction (c) multiplication (d) division

(ix) **Square brackets are also known as:**

(a) box brackets (b) braces (c) parentheses (d) vinculum

(x) $\frac{1}{2}+\left(\frac{3}{2}+\overline{\frac{1}{2}-\frac{1}{2}}\right)=$

(a) 2 (b) $\frac{5}{4}$ (c) $\frac{1}{2}$ (d) 1

2. Simplify the following by using order of operations.

(i) $17-\left[15-\left\{20-\left(7-\overline{9-6}\right)\right\}\right]$

Solution: To solve this expression use BODMAS rule

$=17-\left[15-\left\{20-\left(7-\overline{9-6}\right)\right\}\right]$ Solve vinculum.

$=17-\left[15-\left\{20-\left(7-3\right)\right\}\right]$ Apply subtraction.

$=17-\left[15-\left\{20-4\right\}\right]$ Solve curly brackets.

$=17-\left[15-16\right]$ Solve square brackets.

$=17-\left[-1\right]$ Apply subtraction on square brackets.

$=17+1$ Apply addition.

$=18$

(ii) $\left[\left(10+8\right)\div 6+\left\{\left(50-2\right)\div 6\right\}\right]\times 10$

Solution: To solve this expression use BODMAS rule

$=\left[\left(10+8\right)\div 6+\left\{\left(50-2\right)\div 6\right\}\right]\times 10$ Solve curved brackets.

$=\left[18\div 6+\left\{48\div 6\right\}\right]\times 10$ Solve curly brackets.

$=\left[18\div 6+8\right]\times 10$ Solve division in square brackets.

$=\left[3+8\right]\times 10$ Apply addition in square brackets.

$=11\times 10$ Apply multiplication.

$=110$

(iii) $20.5-\left[1.06+\left\{2.67-9.98-\left(3.3-1.1\right)\right\}\right]$

Solution: To solve this expression use BODMAS rule

$= 20.5 - \left[1.06 + \left\{2.67 - 9.98 - (3.3 - 1.1)\right\}\right]$ Solve curved brackets.

$= 20.5 - \left[1.06 + \left\{2.67 - 9.98 - 2.2\right\}\right]$ Solve curly brackets.

$= 20.5 - \left[1.06 + \left\{-9.51\right\}\right]$ Apply addition on curly brackets.

$= 20.5 - \left[1.06 - 9.51\right]$ Solve square brackets.

$= 20.5 - \left[-8.45\right]$ Apply subtracation on square brackets.

$= 20.5 + 8.45$ Apply addition.

$= 28.95$

(iv) $\left[5\frac{1}{2} \times \left\{1\frac{1}{3} \times \left(2\frac{2}{3} - 2\frac{1}{5} + 2\frac{1}{6}\right)\right\}\right] \times 2$

Solution: To solve this expression use BODMAS rule

$= \left[5\frac{1}{2} \times \left\{1\frac{1}{3} \times \left(2\frac{2}{3} - 2\frac{1}{5} + 2\frac{1}{6}\right)\right\}\right] \times 2$ Change mixed numbers int o improper fractions.

$= \left[\frac{11}{2} \times \left\{\frac{4}{3} \times \left(\frac{8}{3} - \frac{11}{5} + \frac{13}{6}\right)\right\}\right] \times 2$ Solve addition in curved brackets.

$= \left[\frac{11}{2} \times \left\{\frac{4}{3} \times \left(\frac{8}{3} - \frac{66+65}{30}\right)\right\}\right] \times 2$ Take LCM to add fractions.

$= \left[\frac{11}{2} \times \left\{\frac{4}{3} \times \left(\frac{8}{3} - \frac{131}{30}\right)\right\}\right] \times 2$ Apply subtraction in curved brackets.

$= \left[\frac{11}{2} \times \left\{\frac{4}{3} \times \left(\frac{80-131}{30}\right)\right\}\right] \times 2$ Take LCM to subtract fractions.

$= \left[\frac{11}{2} \times \left\{\frac{4}{3} \times \left(-\frac{51}{30}\right)\right\}\right] \times 2$ Multiply fractions in curly brackets.

$= \left[\frac{11}{2} \times \left\{\frac{\cancel{4}^{2}}{\cancel{3}} \times \left(-\frac{\cancel{51}^{17}}{\cancel{30}_{15}}\right)\right\}\right] \times 2$ Simplify fractions in curly brackets.

$= \left[\frac{11}{2} \times \left\{-\frac{2 \times 17}{1 \times 15}\right\}\right] \times 2$ Apply multiplication on fractions.

$= \left[\frac{11}{2} \times \left\{-\frac{34}{15}\right\}\right] \times 2$ Apply multiplication on fractions.

$= \left[\frac{11}{\cancel{2}} \times \left\{-\frac{\cancel{34}^{17}}{15}\right\}\right] \times 2$ Simplify fractions in square brackets.

$= -\frac{187}{15} \times 2$ Apply multiplication.

$= -\frac{374}{15}$

(v) $1\frac{3}{5}\times\left[4\frac{3}{5}-\left\{1\frac{1}{5}\times 9\overline{\frac{2}{5}-9}\right\}\right]$

Solution: To solve this expression use BODMAS rule

$=1\frac{3}{5}\times\left[4\frac{3}{5}-\left\{1\frac{1}{5}\times 9\overline{\frac{2}{5}-9}\right\}\right]$ Change mixed numbers int o improper fractions.

$=\frac{8}{5}\times\left[\frac{23}{5}-\left\{\frac{6}{5}\times\overline{\frac{47}{5}-9}\right\}\right]$ Solve vinculum by applying subtraction.

$=\frac{8}{5}\times\left[\frac{23}{5}-\left\{\frac{6}{5}\times\frac{47-45}{5}\right\}\right]$ Take LCM to subtract.

$=\frac{8}{5}\times\left[\frac{23}{5}-\left\{\frac{6}{5}\times\frac{2}{5}\right\}\right]$ Solve curly brackets.

$=\frac{8}{5}\times\left[\frac{23}{5}-\left\{\frac{12}{25}\right\}\right]$ Apply multiplication in curly brackets.

$=\frac{8}{5}\times\left[\frac{115-12}{25}\right]$ Solve square brackets by applying subtraction.

$=\frac{8}{5}\times\left[\frac{103}{25}\right]$ Apply multiplication.

$=\frac{8\times 103}{5\times 25}$

$=\frac{824}{125}$